

# SOLAR HEATS UP: ACCELERATING WIDESPREAD DEPLOYMENT

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## HEARING BEFORE THE SELECT COMMITTEE ON ENERGY INDEPENDENCE AND GLOBAL WARMING HOUSE OF REPRESENTATIVES ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

SEPTEMBER 24, 2009

**Serial No. 111-10**



Printed for the use of the Select Committee on  
Energy Independence and Global Warming

*globalwarming.house.gov*

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 2010

62-453

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For sale by the Superintendent of Documents, U.S. Government Printing Office  
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## **SOLAR HEATS UP: ACCELERATING WIDESPREAD DEPLOYMENT**

**THURSDAY, SEPTEMBER 24, 2009**

HOUSE OF REPRESENTATIVES,  
SELECT COMMITTEE ON ENERGY INDEPENDENCE  
AND GLOBAL WARMING,  
*Washington, DC.*

The committee met, pursuant to call, at 1:37 p.m., in Room 2318, Rayburn House Office Building, Hon. Edward J. Markey (chairman of the committee) presiding.

Present: Representatives Markey, Blumenauer, Inslee, and Sensenbrenner.

Staff present: Jonathan Phillips.

The CHAIRMAN. Ladies and gentlemen, welcome to the Select Committee on Energy Independence and Global Warming. Our hearing today is going to focus on solar power, which will play a critical role as policymakers around the world promote renewable energy as part of the global response to climate change.

It is important to see this hearing in the larger context. In his first address, yesterday, to the United Nations, President Obama highlighted the unprecedented investment in American renewables as a concrete sign of American progress on global warming. China's Premier, Hu Jintao, also made an important announcement at the U.N., stating China's commitment to draw 15 percent of its total primary energy from nonfossil sources by the year 2020. The announcement by China's Premier has been backed by billions of dollars and there is more to come.

Last week the Speaker and I met with Mr. Wu, who is the chairman of the standing committee of the National People's Congress. He had just arrived from Arizona, where they had signed an agreement with First Solar for a 2,000 megawatt photovoltaic farm to be built in the desert of Inner Mongolia. This will be the world's largest solar photovoltaic power plant project, and is projected to cost nearly \$5 billion. But it is only a small part of a nearly 12,000 megawatt renewable energy park that is planned there as well.

Thankfully, after years of neglect, America is no longer just watching other countries racing ahead. We are now making real strides to reclaim a leadership role in a technology that was invented on our shores.

The Bureau of Land Management has received more than 150 large-scale solar plant applications with a projected capacity of 97,000 megawatts of electricity, mostly in the sunny Southwest. Imagine that; we have healthy competition for clean energy tech-

nology between the barren steppe of Inner Mongolia and the hot desert of Nevada and Arizona.

In just over 70 days, the nations of the world will convene in Copenhagen to commit to solutions for the common good. Here in the United States, the need to position American industry for new areas of long-term growth is also urgent. As Americans across the country can attest, pink slips at work can be as personally devastating as the threat of melting ice caps, rising seas and, more frequent, floods, droughts and hurricanes.

The climate and the economy are two challenges facing our country that will impact us globally and locally. Clean energy technology will be a clean solution to both. The global transition to clean energy presents an opportunity for job creation in all areas of the country. Solar power in the West and Southwest, wind turbines in the plains and Texas, and offshore in New England and the Mid-Atlantic. Biomass in the South and Northwest.

All areas of the country have energy resources that can be made and be used that are plentiful, clean, renewable, affordable and made in America. And that is a statement that cannot be said about most of the oil which we consume, because that comes marked with "made by OPEC."

We have taken the first step in assuring that these clean energy jobs stay in the United States and unleash a global energy revolution.

In June the House passed the Waxman-Markey American Clean Energy and Security Act. When enacted, this bill will cap the carbon pollution causing global warming, require the widespread deployment of renewable energy and energy efficiency, and invest \$200 billion in energy technology.

The clean energy revolution will not happen magically. We need to put in place the policies that will accomplish that goal.

I am pleased that we have such a distinguished group of panelists that will be testifying today.

[The information follows:]



THE SELECT COMMITTEE ON  
**ENERGY INDEPENDENCE AND GLOBAL WARMING**

**Opening Statement of Chairman Edward J. Markey**

**“Solar Heats Up: Accelerating Widespread Deployment.”**

**September 24, 2009**

The focus of today’s hearing is solar power, which will play a critical role as policymakers around the world promote renewable energy as part of the global response to climate change. It is important to see this hearing in the larger context. In his first address yesterday to the United Nations, President Obama highlighted the unprecedented investment in American renewables as a concrete sign of American progress on global warming. China’s Premier Hu Jintao also made an important announcement at the UN, stating China’s commitment to draw 15 percent of its total primary energy from non-fossil sources by 2020.

The announcement by China’s premier has been backed by billions of dollars, and billions of yuans. Last week the Speaker and I met with Mr. Wu Bangguo, chairman of the Standing Committee of the National People’s Congress. He had just arrived from Arizona, where they had signed an agreement with First Solar for a 2,000 megawatt photovoltaic farm to be built in the desert of Inner Mongolia. This will be world’s largest solar photovoltaic power plant project and is projected to cost nearly \$5 billion. But it is only a small part of a nearly 12,000 megawatt renewable energy park planned there.

Thankfully, after years of neglect under the Bush Administration, America is no longer just watching other countries race ahead. We are now making real strides to reclaim a leadership role in a technology that was invented on *our* shores. The Bureau of Land Management has received more than 150 large-scale solar plant applications with a projected capacity of 97,000 megawatts of electricity, mostly in the sunny southwest. Imagine that: we have healthy competition for clean energy technology between the barren steppe of Inner Mongolia and hot desert of Nevada and Arizona.

In just over 70 days the nations will convene in Copenhagen to commit to solutions for the common good. Here in the United States, the need to position American industry for new areas of long-term growth is also urgent. As Americans across the country can attest, pink slips at work can be as personally devastating as the threat of melting ice caps, rising seas, and more frequent floods, droughts, and hurricanes. The climate and the economy are two challenges facing our country that will impact us globally and locally. Clean energy technology will be a key solution to both.

The global transition to clean energy presents an opportunity for job creation in all areas of the country. Solar power in the West and Southwest, wind turbines in the Plains and Texas and off shore in New England and the mid-Atlantic, biomass in the South and Northwest. All areas of the country have energy resources they can use that are plentiful, clean, renewable, affordable, and MADE in AMERICA. That is a statement that cannot be said about most of the oil we consume, which comes marked MADE BY OPEC.

We have taken the first step in assuring that these clean energy jobs stay in the United States and unleash a global energy revolution. Last June, the House passed the Waxman-Markey American Clean Energy and Security Act. When enacted this bill will cap the carbon pollution causing global warming, require the widespread deployment of renewable energy and energy efficiency, and invest \$200 billion in energy technology.

The clean energy revolution will not happen magically. Addressing important issues like electricity transmission, land use, and financing are critical to integrating our vast solar resources. Saving our planet and our economy from our fossil fuel addiction will take targeted policy and active engagement from utilities, the renewable energy industry, project developers, and the environmental community. I am pleased that we have just such a panel of experts today to move this conversation forward.

I thank you all for being here and I look forward to hearing your ideas.

The CHAIRMAN. Let me turn now and recognize the Ranking Member of the committee, the gentleman from Wisconsin, Mr. Sensenbrenner.

Mr. SENSENBRENNER. Thank you very much, Mr. Chairman. There is no good or evil with energy sources because every energy source carries distinctly different positives and negatives.

Developing a new energy system from the ground up is proving to be an impossible task for policymakers. While solar power promises to deliver an endless supply of clean energy, high costs and other environmental concerns are raising significant problems. State mandates, like California's renewable portfolio standard, have led to small amounts of growth in the solar energy sector, but that growth is already being hindered by environmental concerns.

Last week, BrightSource Energy was forced to give up its plan to build a 5,130-acre solar farm in the Mohave Desert after Democratic Senator Diane Feinstein responded with plans to make the area a national monument.

Interior Secretary Ken Salazar has met similar resistance with his plan to fast-track solar development on Federal lands, because of concerns that the development will disturb the habitat of federally protected wildlife. These issues stem from mandating the use of an energy source before the ramifications are fully understood.

Spain's experience with renewable energy should serve as a cautionary tale. President Obama has frequently argued that we should look to Spain as an example of how taxpayer subsidies for renewable energy projects will create so-called green jobs. But economics professor Dr. Gabriel Calzada of Rey Juan Carlos University examined the Spanish policies and advises against adopting their approach. Professor Calzada's study questions the effectiveness of pumping massive subsidies into renewable energy. As the Washington Post reported yesterday Spain's subsidies for photovoltaic, solar, or power jumped from \$320 million in 2007 to \$1 billion, 600 million last year.

While the Spanish Government argues that its subsidies created 200,000 jobs, Dr. Calzada found that for every job the subsidies created, they eliminated up to 2.2 more. Furthermore, only one in ten of the newly created jobs proved to be permanent. Most were created to build infrastructure, but were no longer needed once it was done.

I have often argued that there is no free lunch in our response to climate change. Dr. Calzada's study confirms this. He found that each newly created job in the solar industry cost the Spanish Government and its taxpayers \$855,000.

Solar energy did initially thrive in response to Spain's massive government investment; however, in 2008 Spain withdrew the subsidies. With the subsidies gone, the solar bubble burst and many of the new jobs were eliminated. In other words, the green jobs created by the subsidies proved to be anything but sustainable.

The subsidies have also introduced market volatility. Professor Calzada found that Spain's subsidy of solar energy was 500 percent higher than the market price. While these subsidies thus far only cause modest rises in electricity prices, Spanish Government officials are already warning that prices might suddenly jump as the true cost of these renewable energy projects reach consumers.

I am not against solar power. I am in favor of an all-of-the-above approach to energy production that includes solar power, along with wind, coal, hydropower, nuclear power and increased energy efficiency. But I am also opposed to government policies that pick winners and losers based on popular sentiments. And I am opposed to policies that will increase our energy prices.

Spain's massive use of government subsidies is not an all-of-the-above approach but, rather, an attempt to choose winners and losers. And the one last thing to consider before following Spain's lead on green jobs, Spain's unemployment rate is currently 18½ percent and growing.

I look forward to hearing from today's witnesses about both the positive and negatives about relying on solar power, and I thank the Chairman for the time.

The CHAIRMAN. I thank the gentleman. The Chair recognizes the gentleman from Oregon, Mr. Blumenauer.

Mr. BLUMENAUER. Thank you, Mr. Chairman. And I appreciate my good friend from Wisconsin laying out a fundamental difference in approach.

You know, it is ironic. All American energy sources have been heavily subsidized at one point or another throughout their development. We have a long history of the Federal Government subsidizing everything from jet aviation, semiconductors, computers, the Internet, global positioning systems, laser technology, MRI—the list is extensive—that has developed into major job engines in the United States.

I find it a little frustrating that our friends have chosen not really to engage the issue directly of the hearing, but they are ignoring information provided by established credible experts, and pull out of right field a single report that uses unproven theories, unaccepted assumptions, lacks basic statistical analysis to show that a program that only does not exist in the United States, and is not being proposed by anyone, did not work.

In my home State of Oregon we are watching, even though it rains all the time, we are watching an emergence of a solar energy industry. We are watching in New Jersey, the Garden State, where they have some climate issues, the second largest State of installations. We are moving in an era where it is expected that the solar photovoltaic will soon achieve grid parity.

And in an era when the United States, unlike what happened in the technology explosion, Mr. Chairman, that you were involved in, and actually our Ranking Member has been deeply concerned with, where the United States was an innovator and a global leader in energy technology, today the United States has only 4 of the top 30 countries.

The rest of the world is moving on. I think our witnesses here today can help give a picture of where the world is going. And I appreciate your having this hearing because I think it is an important part of the picture to round out.

The CHAIRMAN. I thank the gentleman very much.

Time for opening statements of members has been completed.

[The prepared statement of Mr. Cleaver follows:]

**U.S. Representative Emanuel Cleaver, II**  
**5<sup>th</sup> District, Missouri**  
**Statement for the Record**  
**House Select Committee on Energy Independence and Global Warming Hearing**  
**“Solar Heats Up: Accelerating Widespread Development”**  
**Thursday, September 24, 2009**

Chairman Markey, Ranking Member Sensenbrenner, other Members of the Select Committee, good afternoon. I would like to welcome our distinguished panel of witnesses to the hearing today.

We all know that renewable energy has been a key factor in legislative efforts recently such as the stimulus and the climate change bill, and will be in future legislative efforts. The policies we put in place will shape the future of our nation and affect the lives of all Americans.

Solar power will be a huge part of this push towards renewable energy that is already occurring. And I know personally that solar projects are not only happening and benefiting people over on the other side of the Continental Divide, but also right in the Heartland. In my home, Missouri’s 5<sup>th</sup> District in Kansas City, we are targeting our stimulus money into a 150-block area of Kansas City’s urban core to help revitalize the neighborhood. One big part of this project is the participation by our local utility, Kansas City Power and Light, to implement Smart Grid Demonstration Projects. KCP&L will pilot rooftop solar systems and battery storage and select homes and businesses in the area. Furthermore, they will partner with local organizations and schools to provide green job training and involve locals and youth in the solar demonstration project and other technology improvements.

These solar projects and KCP&L’s other smart distribution and smart consumption programs will allow them to gain knowledge about customer needs, effectiveness of energy efficiency measures, and storage capabilities. I am proud to be part of an example of communities and utilities working together to solve our energy needs while working towards lowering greenhouse gas emissions.

I thank all of our witnesses for their insight and suggestions, and I appreciate them taking the time to visit with our committee today.

Thank you.

The CHAIRMAN. We will turn to our panel. Our first witness is Steve Kline, Vice President for Corporate Environmental and Federal Affairs for the Pacific Gas & Electric Company. We welcome you, sir.

**STATEMENTS OF STEVE KLINE, VICE PRESIDENT FOR CORPORATE ENVIRONMENTAL AND FEDERAL AFFAIRS, PACIFIC GAS & ELECTRIC, SAN FRANCISCO, CALIFORNIA; FRANK DE ROSA, CHIEF EXECUTIVE OFFICER, NEXTLIGHT RENEWABLE POWER, SAN FRANCISCO, CALIFORNIA; NADA CULVER, ESQ., SENIOR COUNSEL, THE WILDERNESS SOCIETY, WASHINGTON, D.C.; STEPHANIE A. BURNS, CHAIRMAN, PRESIDENT, AND CHIEF EXECUTIVE OFFICER, DOW CORNING CORPORATE CENTER, MIDLAND, MICHIGAN; GABRIEL CALZADA, ASSOCIATE PROFESSOR OF APPLIED ECONOMICS, KING JUAN CARLOS UNIVERSITY, UNIVERSIDAD REY JUAN CARLOS, FACULTAD DE CIENCIAS JURÍDICAS Y SOCIALES, MADRID, SPAIN**

The CHAIRMAN. Whenever you are ready, Mr. Kline, please begin.

**STATEMENT OF STEVE KLINE**

Mr. KLINE. Thank you, Chairman Markey, Ranking Member Sensenbrenner and members of the committee. I am delighted to appear before you on behalf of PG&E Corporation and its subsidiary, Pacific Gas and Electric Company, to offer some thoughts on this very important subject.

As PG&E's chief sustainability officer and Vice President of Corporate Environmental and Federal Affairs, I lead PG&E's climate change strategy programs as well as our habitat conservation planning programs. Investments in renewable resources, including solar resources, create jobs, reduce air pollution and greenhouse gas emissions, and move us toward a low-carbon economy.

Vitally important is the support and role of the Federal Government in expanding the development of solar energy, including policies related to Federal lands, that could help or hinder renewable energy development.

The Federal Government in the economic recovery package has made important investments to support and lay foundation for expanding renewable energy resources, including financial and program support, but there is an opportunity and a need to do more.

Before going further, let me tell you just a bit about PG&E's support and development of solar and other renewable resources. We provide electric and gas service to approximately 15 million people throughout a 70,000 square mile service area in northern and central California. We deliver some of the Nation's cleanest energy. On average, approximately one-half of the power that we deliver to our customers is carbon-free. In 2008 approximately 12 percent of the electricity delivery mix was from California eligible renewable resources, and we forecast that to rise to 15 percent this year.

We are actively pursuing a diverse portfolio of renewable generation resources on behalf of our customers, and I think the critical word there is "portfolio." Since 2002 we have signed more than 66 contracts with existing and new facilities that use or plan to use wind, geothermal, biogas, biomass and solar as their fuel. Solar en-

ergy is an especially attractive source for us because it is available when power is needed most in California during the peak midday summer period. Our portfolio includes both solar PV and solar thermal technologies.

Since early 2008 we have entered into 14 solar contracts, 5 using solar PV technology and 9 using solar thermal or concentrated solar power technologies. In addition, we have a 500-megawatt photovoltaic program pending before the California Public Utilities Commission to help stimulate immediate renewable energy development through both distributed utility-owned generation and power purchase agreements with third parties.

Given the current state of the capital markets, we strongly recommend further extending tax credits, grant programs and loan guarantees. To help assure that we will have the renewable energy resources we need to meet California's RPS—and we assume, soon, a Federal RPS obligation—we are also exploring the possibility of developing commercial-scale projects ourselves.

In addition, we support exploration of a "Green Bank" to provide longer-term certainty and expanded options for financing renewable energy programs. Establishing a clean energy deployment administration, as is being discussed in both the House and the Senate, would assist in reaching those goals.

We are encouraged by the Department of Interior's actions to facilitate large-scale production of renewables. A positive step has been BLM's recent release of its draft scoping document or the programmatic environmental impact statement for development of renewables on public lands in the West. This study will capture 24 solar energy study areas to expedite technologies that are ready for deployment at utility scale.

Given the dual imperatives of reducing greenhouse gas emissions as soon as possible and of bringing renewables on line while protecting natural and cultural resources, we believe that Federal agencies and their State agency analogs must proceed along two parallel paths. One path in the short term is identifying and permitting the solar projects most likely to be shovel-ready in time to be eligible to receive stimulus funds. The other path is longer-term; namely, developing a process to manage solar development on public lands in a more orderly and comprehensive fashion. Clearly a great deal is being asked of BLM staff in connection with this effort, which we strongly support, to get more renewable energy generated on line to consumers.

It is critical that BLM have sufficient resources to ensure that these efforts can move forward in a timely and efficient manner, while ensuring robust environmental review. A significant challenge.

And it won't be a surprise to this committee that what we face in bringing renewable energy on line is the lack of transmission lines located where resources are located. Across the West, thousands of miles of transmission lines will be needed to significantly expand renewable energy production and link those remote resources to areas where electricity is needed most, where people live, including paths on or around Federal lands.

It would be no exaggeration to say that only with increased transmission capacity can the benefits of renewable resources be

fully realized. One way to facilitate that would be through better coordination among agencies.

In addition to better coordination, streamlining the reviews required by State and Federal agencies to remove unnecessary overlap and duplicative requirements could greatly enhance the development of transmission lines needed to link renewable resources to the grid.

The CHAIRMAN. Can you please summarize.

Mr. KLINE. We appreciate the subcommittee's interest in these vital issues and look forward to working with you and other policymakers and stakeholders on this journey to find consensus. I thank you for the opportunity to appear before you.

The CHAIRMAN. Thank you, Mr. Kline, very much.

[The statement of Mr. Kline follows:]

**Testimony of Steven Kline  
Vice President, Corporate Environmental and Federal Affairs  
and Chief Sustainability Officer  
PG&E Corporation**

**Before the**

**Select Committee on  
Energy Independence and Global Warming  
U.S. House of Representatives**

**Hearing on  
“Solar Heats Up: Accelerating Widespread Deployment”**

**September 24, 2009**

Chairman Markey, Ranking Member Sensenbrenner, and Members of the Select Committee, my name is Steve Kline. I am very pleased to appear before you this afternoon on behalf of PG&E Corporation and its subsidiary, Pacific Gas and Electric Company, to provide an overview of some of PG&E's activities relative to solar energy and to offer some thoughts on this important subject. As PG&E's Vice President of Corporate Environmental and Federal Affairs and Chief Sustainability Officer I lead, among other things, PG&E's climate change strategy programs as well as our habitat conservation planning programs. Thank you for holding this hearing to examine the current state of solar energy development.

PG&E, headquartered in San Francisco, California, is one of the largest utility companies in the United States. The company provides natural gas and electric power to approximately 15 million people throughout a 70,000-square-mile service area in northern and central California. PG&E proudly delivers some of the nation's cleanest energy to our customers. On average, approximately half of the electricity we deliver to customers comes from sources that are either renewable and/or emit no greenhouse gases.

Investments in renewable resources, including solar resources, create jobs, reduce air pollution and greenhouse gas emissions, and move us toward a low-carbon economy in California and across the nation. Vital to the support and role of the federal government in expanding the development of solar energy, including policies related to federal lands that can help or hinder renewable energy expansion.

The American Recovery and Reinvestment Act of 2009 (ARRA or Economic Stimulus Package) has provided a foundation of support for the development of solar and other renewable energy resources in a time of economic uncertainty. The renewables industry has benefitted from the certainty provided by these longer-term, critical extensions and modifications of investment and production tax credits. Development of these projects can help invigorate our economy and support a new green energy paradigm.

Given the current state of capital markets, we would recommend further extending tax credits, grant programs, and loan guarantees. Further we support exploration of a “Green Bank” to provide longer term certainty and expanded options for financing renewable energy projects. Establishing a Clean Energy Deployment Administration, as is being discussed in the House and Senate, could assist in reaching these goals.

We are also encouraged by the Department of Interior’s (DOI) investment of \$41 million from the economic recovery package to facilitate large-scale production of renewables while protecting ecosystems on Bureau of Land Management (BLM) land. We also support the Department’s focus on processing existing project applications that may be eligible for ARRA stimulus funding.

In addition, there have been some positive developments on the procedural front. Recently, the Interior Department, through its Bureau of Land Management, released its draft scoping document for the Programmatic Environmental Impact Statement (PEIS) on the development of renewables on public lands in the West.

According to the BLM, this PEIS is “one of several on-going DOI initiatives in support of the President’s New Energy for America Plan that sets a target of ensuring that 10 percent of U.S. electricity is generated from renewable sources by 2010, rising to 25 percent by 2025.” In addition to examining the “environmental effects of all solar energy technologies that are ready for deployment at utility-scale,” the PEIS will study in-depth 24 tracts of land, referred to as Solar Energy Study Areas (SESAs), in six western states.

At the same time that the BLM and DOE are preparing the PEIS, the Bureau will also “continue to process all existing applications” – which total 2,256 – beginning with the so-called “fast-track” projects.

Clearly, a great deal is being asked of BLM staff in connection with the overall effort – which we support – to get more renewable energy generated and on line to consumers. Equally clearly, these related responsibilities will strain the agency’s existing staff. Given the staffing needs involved in both processing the fast-track applications and preparing the PEIS, it is critical that the BLM have sufficient resources to ensure that both of these efforts can move forward in a timely and efficient manner while ensuring robust environmental review.

#### **Overview of PG&E Projects**

In 2008, approximately 12% percent of the electricity we provided to our customers was from California-eligible renewable resources. As defined in California Senate Bill 1078, which created California’s renewable portfolio standard, an eligible renewable resource includes geothermal facilities, hydroelectric facilities with a capacity rating of 30 MW or less, biomass, biogas, biodiesel, fuel cells using renewable fuel, selected municipal solid waste facilities, solar facilities, wind facilities, as well as ocean wave, ocean thermal, and tidal current technologies.

In 2009, PG&E has forecasted 15% of its energy deliveries to customers will come from eligible renewables, another 16% from large hydroelectric resources that are not eligible for the state's RPS, and 20% from nuclear energy, which has zero carbon emissions.

Since 2002, PG&E has signed more than 40 contracts with existing and new facilities that use or plan to use wind, geothermal, biogas, biomass, and solar as their fuel source. We recognize the need for a diverse portfolio of renewable resource typologies and technologies – both in California and beyond its borders. For example, PG&E is a leader in researching ways to expand the use of renewable biogas, a prospect that holds significant potential in a state that is home to two million dairy cows. Last year, PG&E and BioEnergy Solutions began operating the first project in California that is delivering natural gas to a utility using methane produced from animal waste at Vintage Dairy in Fresno County. This innovative effort, which produces gas that meets PG&E's gas quality specifications, is significantly reducing the farm's methane emissions while providing a valuable energy resource for our customers.

Solar energy is an especially attractive renewable power source for because it is available when power is needed most in California – during the peak mid-day summer period. PG&E's portfolio includes both solar photovoltaic and solar thermal technologies. Since early 2008, PG&E has entered into five solar contracts, three using solar PV technology and two using solar thermal (or concentrated solar power) technologies. One of the PV facilities, Sempra's El Dorado facility in Boulder City, Colorado, has achieved commercial operation, while the other solar facilities are still being developed.

Technological innovation and incorporating "learning curve" benefits are expected to reduce the cost of solar technologies over the next few years, leading to higher levels of solar development. For example, a study prepared by the National Renewable Energy Laboratory (NREL) on the potential for concentrated solar power, or CSP, in California and the rest of the Southwest U.S. indicated that CSP in California could produce upwards of seven times the energy needed to serve the state. NREL also suggests that costs for CSP technologies could decline significantly, from approximately 16 cents per kilowatt-hour on average today, to approximately 8 cents per kilowatt-hour in 2015. The halving of the cost of this energy in seven years is premised on an assumption that at least 4,000 MW of CSP will be built by then – not just contracted for – to achieve "learning curve" benefits. In summary, getting the facilities built is a crucial element of reducing costs in the long run.

We are also impressed by the progress being made in reducing the cost of photovoltaic (PV) technology and look forward to a healthy competition between CSP and utility-scale photovoltaics to meet the peak electric needs of California customers. We expect the competition between the two solar technologies will help our customers over time by bringing the cost overall of solar energy down.

There are challenges to fully realizing the potential of these clean, renewable, domestic energy resources. As a load-serving entity subject to meeting California's RPS requirements, our perspective is primarily driven by our role as one of the nation's largest purchasers of renewable power through power purchase agreements. In light of the financial crisis and resulting credit freeze – and in order to help assure that we will have the renewable energy projects needed to

meet our California RPS obligations – we are also exploring the possibility of developing commercial-scale solar projects ourselves.

We acknowledge the potential tension between important environmental and conservation needs and state and national imperatives to decarbonize energy sources in light of climate change. We are committed to working with other stakeholders and with policymakers and regulators to finding a path forward that brings renewable generation on-line as quickly as possible while protecting our unique and sensitive natural and cultural resources. As such, PG&E is pleased to be part of an informal working group recently formed to examine ways to balance the need for timely development of renewable energy sources with the need to protect desert ecosystems, landscapes and species.

Given the amount of overlap with federal lands and agencies for projects in the West, it remains critical that efforts continue to address the following areas:

#### **A. Transmission**

A significant challenge we face in bringing renewable energy resources online faster is the lack of transmission lines to the areas where the renewable resources are located. In California, for example, most large-scale concentrated solar power generating facilities are sited in remote desert locations, far away from the areas where the electricity is needed most. Across the West, thousands of miles of transmission lines will be needed to significantly expand renewable energy production, including paths on or around Federal lands. It would be no exaggeration to say that only with increased transmission capability can the benefits of renewable resources be fully realized.

One way to facilitate added transmission would be through better coordination among agencies. In addition to better coordination, state and federal agencies should remove unnecessary overlap or duplicative requirements in order to enhance the development of transmission lines needed to link renewable energy resources to the grid (and hence, consumers). Carefully-crafted permitting improvements would not – and should not – have to come at the expense of protecting critical natural and cultural resources.

#### **B. Storage**

Cheap energy storage is sometimes called the holy grail of renewable energy and a key component of future "smart grids" envisioned by utilities like PG&E.

Now PG&E is taking steps to make it a reality, applying to the Department of Energy for a \$25 million Smart Grid stimulus funding grant, under the American Recovery and Reinvestment Act, for a large compressed air energy storage (CAES) project. PG&E plans to pump compressed air into an underground reservoir, using mainly wind energy produced during non-peak hours, and then release it to generate electricity during periods of peak demand. The project has an output capacity of 300 megawatts – similar to a mid-sized power plant – for up to 10 hours. It will take an estimated five years to design, permit and build.

Energy storage is a strategic complement to the generation resources that provide power to our customers because storage helps utilities maximize the efficiency and flexibility of our grid while enabling the delivery of clean, renewable energy. We appreciate legislation proposed by Sen. Wyden that would establish tax incentives for energy storage technologies such as compressed air, pumped hydro, and batteries.

### **C. Project Permitting**

Another set of challenges relate to permitting the renewable energy projects themselves. Due to frozen credit markets we are in the process of also developing several renewable projects, but our primary experience is as one of the largest purchasers of renewable energy in the U.S. From our perspective as a renewable energy purchaser, it is worth noting that many of the applications for permits for renewable development are located within the California Desert Region and involve the use of federally managed land. Those that do not involve development on federally-managed land often include a transmission intertie that must cross federally managed land.

Adding complexity, in many cases, development in the desert may involve lands that are home to federally listed species and/or habitat. Let me offer three observations here. First – and obviously – the U.S. Fish and Wildlife Service (“USFWS”) has a critical role to play. Like the BLM, the USFWS will need adequate funding to ensure that it has the staff in place to handle the increased volume of work generated by the desert solar projects. Without additional resources at the USFWS Field Offices, other critical infrastructure projects could be delayed due to inadequate Endangered Species Act permitting staff.

Second, we encourage the BLM, as part of its PEIS’s consideration of Solar Energy Study Areas, to undertake a programmatic Section 7(a)(2) consultation with the U.S. Fish and Wildlife Service. To the extent possible, in order to provide solar developers with greater certainty, this Section 7 consultation should also seek to provide project-level “take” coverage under the federal Endangered Species Act.

Third and finally, in the vast majority of currently proposed projects, coordination is required among federal agencies and between federal and state agencies. Therefore, it will be critical that the Interior Department have a process in place to facilitate efficient, expedited resolution of problems and obstacles as they arise, especially since the permitting requirements for these projects will be extensive. We are pleased that Secretary Salazar recently named David Nawi as his Senior Advisor for California and Nevada, and we look forward to Mr. Nawi bringing his extensive talents to bear on enhancing the coordination among the federal agencies and between the federal and state agencies.

PG&E supports Secretary Salazar’s plan to open four Renewable Energy Coordination Offices with smaller renewable energy teams in other western states. The stated intent to “cut red tape by expediting applications, processing, reviews and permitting of renewable energy projects” is a positive step forward for the challenges solar development faces and builds off the ongoing work by BLM to develop a comprehensive approach to solar projects in the Mojave Desert region and the West.

**D. Moving Forward**

Given the dual imperatives of reducing greenhouse gas emissions as soon as possible and of bringing renewables on-line while protecting natural and cultural resources, PG&E believes that the federal agencies (and their state agency analogues) must proceed along two parallel paths. One path – the short-term path – is identifying and permitting the solar projects most likely to be “shovel ready” in time to be eligible to receive stimulus funds. The other path is longer-term, namely developing a process to manage solar development on public lands (i.e., lands managed by the Department of Defense (DOD) and Bureau of Reclamation (BuRec) as well as the Department of Energy (DOE) and the Bureau of Land Management (BLM)) in a more orderly and comprehensive fashion.

In our view, the BLM PEIS offers a means of establishing such a comprehensive program. Along with other stakeholders from the environmental and solar developer communities, PG&E has recently commented to the BLM on its PEIS scoping document, recommending in part that its PEIS should lead to the establishment of a comprehensive program for managing solar development on federal public lands that includes designation of appropriate lands for solar development in the short term and a process for identifying lands for such development in the long term, based on environmental and technical analyses (including insolation levels) as well as transmission and other infrastructure considerations.

The PEIS and the resulting program should also serve as the basis upon which others, including the State of California, can come together with DOI and other federal land managers to formulate a comprehensive program that addresses development of renewables, i.e., wind and geothermal as well as solar, across multiple jurisdictions, private and public alike, in California.

At PG&E, we are working with policymakers, regulators, and relevant stakeholders to help address these challenges. For example, California’s utilities are working closely with state and federal agencies and representatives of leading environmental groups on the Renewable Energy Transmission Initiative, which is expected to identify a prioritized listing of Competitive Renewable Energy Zones (CREZ) and conceptual transmission plans to access these zones. Improving the permitting process for transmission lines to reach the CREZs is a critical path item to achieving the 33% RPS goal established by Governor Schwarzenegger’s recent Executive Order.

As we work to achieve California and the US goals on climate change and to decarbonize energy supply resources, as well as protect land, water, and wildlife resources, the federal government is well positioned to help bring greater clarity through sound policies.

We appreciate this Select Committee’s interest in these vital issues, and look forward to working with you, other policy makers, and stakeholders on this journey on the road to consensus. On behalf of PG&E, I want to thank you for the opportunity to appear before you today and I look forward to answering your questions.

Thank you.

The CHAIRMAN. Our next witness is Frank De Rosa. He is the Chief Executive Officer of NextLight Renewable Power. We welcome you sir.

#### **STATEMENT OF FRANK DE ROSA**

Mr. DE ROSA. Thank you for the opportunity to speak about the progress and the challenges we face in developing large-scale solar generation.

NextLight Renewable Power is a developer of competitively priced utility-scale solar generation. We are not a technology company, we are power plant guys. Our expertise is in the siting, permitting, financing, construction and operation of power plants. We apply the technologies to our projects so as to provide the best products to our utility customers.

NextLight has approximately 1,000 megawatts of solar generation in development and permitting in the West, in Arizona, California, Nevada and the other Western States. That is sufficient to meet the needs of approximately 200,000 residential homes. It would create about 1,500 construction jobs and 100 to 200 permanent jobs during operation.

I have three main points today. First is to restore the \$2 billion that was transferred to Cash for Clunkers back to the DOE Loan Guarantee Program. The second is to extend the ITC grant beyond the December 2010 expiration date. And the third is to establish the Green Bank.

Now, why do we need these programs? Our biggest obstacle in developing these projects is the upfront capital cost of renewable energy generation. Without carbon costs explicitly included, when a utility looks at their supply portfolio, they see renewable generation as more expensive than fossil. If we can close that gap, utilities would gladly procure more renewable generation and more generation would get built without impacting electric rates.

These three measures go a long way to close the gap, at little taxpayer expense, by reducing the financing costs of these projects.

So, very briefly, the Loan Guarantee Program, \$2 billion would accelerate \$20 billion of renewable generation. The ITC grant was enacted to address the current shortage of tax equity, but the fact is that the ITC grant is more efficient than the investment tax credit. Every dollar of the grant goes to a project, as opposed to the investment tax credit where we need to bring in tax investors who require more than a dollar for a dollar of tax offset, and it requires a substantial structuring transaction cost to do these very complicated financing arrangements. We estimate a 15 to 20 percent loss with the investment tax credit compared to the ITC grant.

Lastly, the Green Bank, which was passed by this House and is in the Senate here, like the Export-Import Bank, the purpose would be to lend to renewables at rates—basically at Federal rates. And if you compare, say, a 5 percent rate, long-term debt rate, under something like the Green Bank to the 8 or 9 percent interest rates in the market today, that translates to about 4 cents a kilowatt hour reduction in the cost of renewable generation. That is a lot. That is enough to close the gap between renewables and fossil generation. So it is the most cost-effective way to build renewable

generation with minimal impact on electric rates or on the Federal budget.

So in conclusion, our biggest obstacle is the upfront cost of these very capital-intensive projects. And Congress can materially reduce that cost, without significant taxpayer expense, by enacting the three points that I mentioned before.

The CHAIRMAN. Thank you, Mr. De Rosa, very much.  
[The statement of Mr. De Rosa follows:]

**Testimony of Frank De Rosa  
Chief Executive Officer  
NextLight Renewable Power, LLC**

**Before the**

**Select Committee on Energy Independence and Global Warming  
United States House of Representatives**

**September 24, 2009**

Thank you, Chairman Markey, Ranking Member Sensenbrenner, Members of the Committee. I am Frank De Rosa, Chief Executive Officer of NextLight Renewable Power, headquartered in San Francisco, California. Thank you for the opportunity to appear today before the Committee to offer my views on the progress and challenges of NextLight in our development of utility-scale solar energy projects in the western United States. Our large development projects are on the scale of traditional power plants, are designed to provide utilities with reliable and efficient solar power under long-term sale contracts, and will make a substantial contribution to the important state and federal goals of increasing our nation's use of renewable energy.

**NextLight Renewable Power**

NextLight's mission is to develop competitively priced, utility-scale renewable generating facilities using proven solar technologies. Our expertise is in the utility energy market and in siting, permitting, constructing, owning and operating power plants. We are not a technology company and do not promote the adoption of any particular solar technology. We apply the best solar application to the needs of our utility customers and the particular characteristics of our project locations.

NextLight's solar development program is funded by Energy Capital Partners, a private equity fund focused on investing in North America's energy infrastructure. Energy Capital Partners has a high quality diversified investor base consisting of over 120 limited partners from

public employee pension funds, union pension funds, college and university endowments, foundations and others.

NextLight personnel understand the permitting, environmental and commercial realities of developing and financing large power projects. At various times in our careers, we have been on both the buy and sell sides of electric power plant development. In roles with electric utility and independent power plant development companies, my colleagues and I have procured over 3,000 MW of renewable energy and have developed, permitted and constructed over 8,000 MW of electric power generation in the West.

Since its inception in 2007, NextLight has sited and commenced permitting of over 1,000 MW of solar power projects in California, Nevada, Arizona and the West (see Attachment 1 for map of NextLight's projects in development). We expect to begin construction and start delivering power from some of these in 2010. NextLight's major projects are:

<b>California</b>	<b>AV Solar Ranch 1</b>	230 MW Photovoltaic (PV) project with a Power Purchase Agreement with PG&E
<b>Nevada</b>	<b>Silver State</b>	250 MW PV project that was selected by the U.S. Bureau of Land Management for "fast track" permitting status (see Attachment 2, BLM press release)
<b>Nevada</b>	<b>Boulder City</b>	150 MW PV project located in the City of Boulder City Solar Enterprise Zone.
<b>Arizona</b>	<b>Agua Caliente</b>	290 MW project that has received its preliminary state permits for either PV or solar thermal trough technology.

These four projects would satisfy the electricity needs of approximately 350,000 homes, employ 1,500 people in construction and 100 in operations, and represent a capital investment of over \$3.5 billion.

**Solar Energy Development Requires Efficient and Effective Capital**

I have three main points today:

1. Restore the \$2 billion appropriation that was used for the Cash for Clunkers Program back to the Department of Energy's Section 1705 Loan Guarantee Program authorized in the American Recovery and Reinvestment Act;
2. Extend the Treasury Department's grant program in lieu of the investment tax credit for renewable energy property beyond the current December 31, 2010 expiration date;
3. Provide for an effective long-term financing program for renewable energy power projects, such as the Clean Energy Deployment Administration (the "Green Bank") as proposed in both H.R. 2454 and S. 1462.

Why do we need these programs?

The immediate need to address climate change and improve our nation's energy security has been well documented by this Committee. Currently, the biggest obstacle to wider deployment of renewable energy resources is not permitting or transmission, though those are definitely challenging, but the up-front capital cost of renewable energy projects. Because the cost of carbon emissions has not been incorporated into the price of fossil generation, such generation appears cheaper than renewable energy. Not surprisingly, utilities try to keep their rates as low as possible. Thus, renewable energy appears to be more expensive. Reducing the up-front cost of renewable generation will close the gap between fossil fuels and renewables and thus increase utilities' procurement of renewable resources.

Renewable energy facilities like solar and wind are very capital intensive. Think of the up-front capital cost as a pre-payment for fuel. Thus, the cost of capital is the single most important factor in the overall cost of renewable energy. Financing mechanisms that are efficient and can lower the cost of capital to renewable projects will be the biggest drivers to their deployment.

### **The DOE Loan Guarantee Program**

Until the financial disruptions of 2008, private lending markets provided the debt financing required for renewable energy projects. While NextLight has considerable expertise in accessing the project finance lending market and maintains regular dialogue with participants in this market, it is unclear when traditional financing options will return. To bridge the gap, Congress provided funding in the Recovery Act for a DOE loan guarantee program to support innovative and commercial renewable energy technologies and transmission. DOE is committed to implementing this program on a meaningful scale in a manner that protects taxpayers from undue risk.

In August, one-third of this funding -- \$2 billion -- was transferred out of the DOE budget to provide supplemental appropriations for the "Cash for Clunkers" program (see P.L. 111-47). Restoring the \$2 billion appropriation to DOE will support an estimated \$20 billion in private investment and create thousands of new jobs. The Administration and Congressional leadership have publicly committed to restoring these funds. I urge immediate action to accomplish this goal.

Also, I request that the current date of September 30, 2011, by which a project must commence construction to qualify for a loan guarantee, be extended by at least a year. We would also ask that in fiscal year 2011 at least \$3 billion be appropriated to continue the Section 1705 temporary loan guarantee program, because the private capital markets will not fully recover until at least 2012. While DOE has been working diligently to coordinate with other federal agencies involved in the Loan Guarantee Program and has been seeking input on program design from renewable developers and private lending institutions, the initial DOE solicitation for innovative renewable technologies has only recently been available and the solicitation for commercial technologies has still not been issued.<sup>1</sup> It should also be noted that Loan Guarantee Program projects are subject to the requirements of the National Environmental Policy Act (NEPA), which can take more than 18 months to satisfy if an environmental impact statement is required. Thus, NEPA compliance could prevent a renewable project from starting construction by the current September, 2011 deadline.

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<sup>1</sup> See Loan Guarantee Solicitation Announcement, DE-FOA-0000140, July 29, 2009, <http://www.lgprogram.energy.gov/2009-ren-energy-sol.pdf>

**The Treasury Department's Grant In Lieu of Tax Credits Program**

While investment tax credits have been a mainstay of financing solar energy resources, this mechanism is not efficient. Its effectiveness has been subject to the availability of tax equity investment capital. Since last year, little tax equity has been available at any price.<sup>2</sup>

Moreover, investment tax credit causes leakage; not every dollar of taxes provided by the federal government goes to renewable energy projects. That is because development companies such as NextLight can only utilize the investment tax by adding a third party (the tax equity investor) through complicated financing structures (leveraged leases, equity flips, etc.). The tax equity investor requires a premium to participate in the transaction (that is, it charges the project developer more than \$1 for every \$1 of tax offset), and the complicated financing structures entail significant transaction costs.

As you know, the Recovery Act provided renewable project developers with the option to receive a cash grant from the Treasury Department in lieu of the investment tax credit. Congress assumed that the tax equity markets recover by 2011, and therefore the grant program was only authorized for projects that commence construction on or before December 31, 2010. The delays in implementing the DOE's loan guarantee program and the length of time to get a loan will make it difficult for projects to begin construction in time to qualify. The grant program in lieu of the investment tax credit sends every government dollar directly to renewable projects. The federal government gets its money's worth. We request that it be extended to match the expiration of the investment tax credit program for renewables.

**A "Green Bank" Will Lower the Cost of Capital**

The Clean Energy Deployment Administration (CEDA), or Green Bank, is an important part of the American Clean Energy and Security Act of 2009 (ACES) as passed out of the House on June 26. There are also provisions to establish CEDA in the American Clean Energy Leadership Act (ACELA) that Senators Bingaman and Murkowski have passed out of the Senate Energy and Natural Resources Committee.

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<sup>2</sup> In 2008 there were 20 players in the tax equity market. In 2009, that pool has shrunk to five.

By providing loans and loan guarantees at federal treasury interest rates, the Green Bank would lower the cost of financing debt to renewable power projects by 2-4 percentage points. That translates into a busbar electric price reduction of approximately 4 cents per kwh for a typical solar project. This would directly address the biggest obstacle to expanded deployment of renewable generation: the cost to utilities. The Green Bank would provide loans and loan guarantees at minimal risk to the taxpayer. The Green Bank would lend overwhelmingly to projects with a proven history of effective deployment. The default rates on such projects are extremely low and, even under the most cautious assumptions, the prospective default rate would be roughly 10%. This means under a very cautious projection the risk to the taxpayer is roughly 10% of the overall capitalization. The Green Bank would see the loans and loan guarantees repaid in the vast majority of the projects, which means the taxpayer will be exposed to minimal levels of risk.

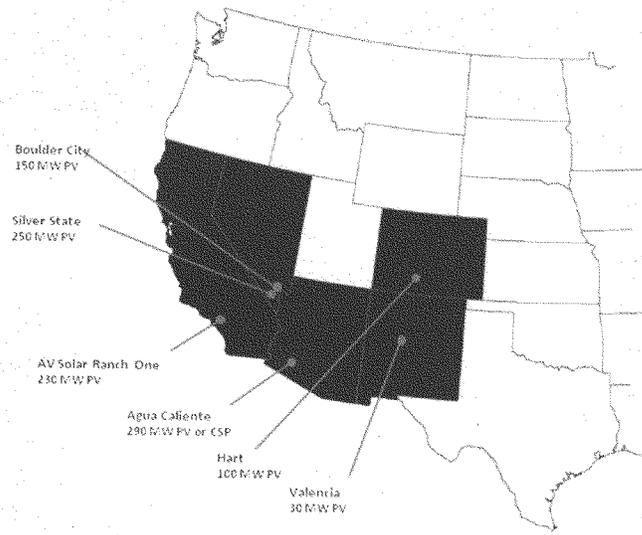
The Green Bank is modeled after federal corporations with proven track records, such as the Export-Import Bank and the Overseas Private Investment Corporation. It would be a wholesale, non-profit corporation wholly owned by the government and accountable to Congress. It is a very low-cost way to generate the financing for large volumes of renewable power without materially affecting utility rates and disrupting today's economy. Establishment of a Green Bank would be a significant commitment to moving our energy supply – and our economy – toward clean, domestically-produced sources of energy.

### **Conclusion**

The biggest obstacle to the deployment of large volumes of renewable energy is the up-front cost of these capital-intensive projects. Congress can materially reduce that cost without significant taxpayer expenditures by enacting the three measures described above.

Thank you.

KEY SOLAR PROJECTS  
OVER 1,000 MW UNDER DEVELOPMENT



U.S. Department of the Interior



OFFICE OF THE SECRETARY  
**U.S. Department  
 of the Interior**

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## News Release

FOR IMMEDIATE RELEASE

Date: June 29, 2009

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### Secretary Salazar, Senator Reid Announce 'Fast-Track' Initiatives for Solar Energy Development on Western Lands

LAS VEGAS, Nevada – Under initiatives announced today by Secretary of the Interior Ken Salazar and U.S. Senator Harry Reid (D-NV), federal agencies will work with western leaders to designate tracts of U.S. public lands in the West as prime zones for utility-scale solar energy development, fund environmental studies, open new solar energy permitting offices and speed reviews of industry proposals.

"President Obama's comprehensive energy strategy calls for rapid development of renewable energy, especially on America's public lands," said Secretary Salazar. "This environmentally-sensitive plan will identify appropriate Interior-managed lands that have excellent solar energy potential and limited conflicts with wildlife, other natural resources or land users. The two dozen areas we are evaluating could generate nearly 100,000 megawatts of solar electricity. With coordinated environmental studies, good land-use planning and zoning and priority processing, we can accelerate responsible solar energy production that will help build a clean-energy economy for the 21st century."

"I want to thank Secretary Salazar for his commitment to renewable energy, and for being here in Nevada today," said Reid. "This is the Secretary's second visit to Nevada to announce key renewable energy initiatives that will help make Nevada the blueprint for everything that's right about the future of our nation's energy policy. We've got sunny skies, strong winds, and land that when used properly, will allow us to lead the nation's children into a cleaner, more efficient, and more profitable tomorrow."

Under one initiative, 24 tracts of Bureau of Land Management-administered land located in six western states, known as Solar Energy Study Areas, would be fully evaluated for their environmental and resource suitability for large-scale solar energy production. The objective is to provide landscape-scale planning and zoning for solar projects on BLM lands in the West, allowing a more efficient process for permitting and siting responsible solar development.

Those areas selected would be available for projects capable of producing 10 or more megawatts of electricity for distribution to customers through the transmission grid system. Companies that propose projects on that scale in areas already approved for this type of development would be eligible for priority processing. The BLM may also decide to use alternative competitive or non-competitive procedures in processing new solar applications for these areas.

Secretary Salazar and Senator Reid also announced the opening of a new Interior renewable energy coordination office (RECO) in Nevada, the first of four, with the others located in Arizona, California, and Wyoming. The offices will help to expedite processing of the increased number of applications for renewable energy projects on U.S. lands.

Currently BLM has received about 470 renewable energy project applications. Those include 158 active solar applications, covering 1.8 million acres, with a projected capacity to generate 97,000 megawatts of electricity. That's enough to power 29 million homes, the equivalent of 29 percent of the nation's household electrical consumption. The BLM will continue to process existing renewable energy applications, both within and outside of the solar energy study areas.

Interior also is coordinating with states to expedite permitting for a number of solar power projects nearing approval. The BLM will begin site-specific environmental reviews for two major projects in Nevada that would have a combine capacity of more than 400 megawatts of electricity: the NextLight Silver State South array is planned to produce 267 megawatts; and the NextLight Silver State North would produce about 140 megawatts. Interior continues to work with the Western Governors Association to develop renewable energy zones and transmission corridors.

The Solar Energy Study Areas, located in Nevada, Arizona, California, Colorado, New Mexico and Utah and outlined in maps to be published in the Federal Register Tuesday, encompass about 670,000 acres. Only lands with excellent solar resources, suitable slope, proximity to roads and transmission lines or designated corridors, and containing at least 2,000 acres of BLM-administered public lands were considered for solar energy study areas. Sensitive lands, wilderness and other high-conservation-value lands as well as lands with conflicting uses were excluded.

As part of this initiative, the BLM will segregate the study areas from new mining claims and other actions initiated by third parties under public land laws. This temporary 2-year segregation will give BLM time to complete its environmental review and make a determination on solar energy zones. It will not affect rights established prior to the temporary segregation. The public will have the opportunity to comment on these proposed solar energy study areas during the environmental reviews before any final decisions are made. The evaluation is expected to be completed in late 2010.

An ongoing federally-funded environmental evaluation of potential solar energy development on public lands in 6 Western States, known as the Solar Programmatic Environmental Impact Statement, or PEIS, will be expanded to include an in-depth analysis of the potential impacts of utility-scale solar energy development on public lands in the 24 Solar Energy Study Areas. This enhancement will be supported by additional federal funding under the American Recovery and Reinvestment Act. The BLM will continue to process the 158 active solar applications during preparation of the PEIS. The bureau will also continue to accept new applications both within and outside of the Solar Energy Study Areas. However, these applications will be subject to any decisions made from the Solar PEIS.

This expanded evaluation, a collaborative effort with the Department of Energy, will allow the Bureau of Land Management to take a close look at each study area to determine where it makes sense to develop large-scale solar projects in an environmentally responsible way. Companies proposing solar energy projects in designated areas would be able to "tier" to this study, using it as part of their environmental impact studies for site-specific projects, which are required by the National Environmental Policy Act.

Additional information on the BLM's renewable energy program is available at [www.blm.gov](http://www.blm.gov)

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Last Updated on 06/29/09

The CHAIRMAN. Our next witness is Nada Culver. She is the senior counsel at the Wilderness Society. She has many years of experience in environmental law. We welcome you.

**STATEMENT OF NADA CULVER**

Ms. CULVER. Thank you, Chairman Markey and members of the committee. And thank you for pronouncing my name correctly. Wandering around the Southwest with a name like this has been a challenge.

I work in the public lands campaign of The Wilderness Society. Our mission is to protect wilderness and inspire Americans to protect our wild places. For more than 70 years we have worked to ensure that land management practices are sustainable and based on sound science.

I lead a part of the organization called the BLM Action Center which tracks land-use planning and policy and is dedicated to helping the public effectively engage and participate.

We appreciate the leadership that Chairman Markey and others on the committee have demonstrated in seeking clean energy solutions to the impacts of climate change to recently passed legislation. You have asked us to present testimony today regarding how public lands can contribute to these solutions through large-scale solar energy development. My written statement lays out in a lot of detail the key considerations for The Wilderness Society.

Today my testimony is going to focus on our optimism regarding the direction that Secretary Ken Salazar is already leading us in. Our wildlands in our communities are threatened by global warming and our reliance on fossil fuels. We see solar energy development and other sources of renewable energy as an important part of responding to these threats, and the public lands have a role to play.

Secretarial Order 3285 set the stage for a new approach to energy development on the public lands, focusing on development and transmission of renewable energy from appropriate areas. This thoughtful approach is reflected in the ongoing efforts of the Department on solar energy, and we hope honestly to see it applied to other types of energy development.

The key elements of this strategy are identifying the places that are most appropriate for large-scale development, while protecting places that are not appropriate or needed, and providing the financial tools needed to incentivize responsible development and proactive involvement of other interested and knowledgeable parties. A robust program in this model would be able to increase the likelihood of timely approval of projects and decrease the unacceptable environmental impacts and the resulting controversy and opposition to projects that come with that.

Secretary Salazar has committed the Department to identifying and prioritizing the specific locations in the United States best suited for large-scale production. This is really the centerpiece for responsible development, locating it in the right places and with the right protection.

The Department has commenced a programmatic environmental impact statement for solar energy and is designating solar energy zones that will be prioritized. These zones are being designated

with important criteria, both for proximity to transmission and suitability of terrain and potential for energy; but also by, from the start, excluding sensitive resources from consideration, resources like the BLM's National Landscape Conservation System and critical habitats for endangered species.

Because solar energy development involves long-term use of land, damaged natural resources, and really effectively precludes other uses, it is extremely important for it to be directed to lands that do not have other sensitive resources. And, for example, NextLight's Silver State North and South projects in Nevada are being sited to avoid BLM areas of critical environmental concern in lands proposed by citizens for wilderness protection.

Another key element of the strategy is that once energy zones are identified, development is limited to those lands. This stands in stark contrast to the Department's approach to oil and gas development, which has been to make all lands available for leasing without considering other values or strategically prioritizing these lands. This has resulted, as we have all seen, in significant controversy, and precluded thoughtful management of the public lands.

Focusing on lands that don't have sensitive resources and are close to transmission will minimize environmental damage and loss of other uses that is honestly associated with large-scale solar development.

An important siting option is found on brownfields and other already disturbed lands, like abandoned mines or fallow agricultural lands. These are found on both public and private lands. Both the EPA and the National Renewable Energy Lab have estimated that these types of lands could provide up to 950,000 megawatts of utility-scale solar. These sites are close to population centers and transmission, and they are already zoned for industrial uses. They actually improve communities by reducing blight. They were in place already in Colorado at Fort Carson, and, in my home State of New Jersey, a landfill has recently approved a brownfield as well.

Both the EPA and Arizona BLM have active brownfield programs, and these really could and should be expanded and incentivized, including through a renewable electricity standard.

Chairman Markey, you raised a profile of this earlier in this year in a letter to EPA Administrator Lisa Jackson, and we hope to see this continue. But because development of a solar utility scale will transform the land and preclude most other uses, it is important that we look at all types of onsite and offsite litigation measures based on credible science, and take into account the many other uses and values of the public lands; things like wilderness values, wildlife habitat and recreation. Everything from backcountry hunting and mountain biking should be accounted for. A new transmission is needed, but, again, this must be done with a thoughtful approach to protect the environment and avoid further contributions.

We would also encourage that while the Department of Interior is hard at work, simultaneously developing a program, identifying zones and analyzing many pending applications, including those receiving stimulus funding, they will need to be assisted with addi-

tional resources so that they can actively manage this program. Similar funding was assigned in the prior administration to fund oil and gas permitting, and the BLM will need similar funding from this administration. They have a unique opportunity, although a challenge, to develop this from the ground up.

In conclusion, we believe that we can move forward with large-scale solar energy development while protecting and valuing other resources. I just wanted to note that the Secretary's order specifically noted that additional policies might be needed to fully support renewable energy, including revising Geothermal, Wind, and West-Wide Corridors Programmatic EISs. We believe it is imperative that we improve those, as well as the oil and gas development program.

Thank you. I look forward to your questions.

The CHAIRMAN. Thank you, Ms. Culver, very much.

[The statement of Ms. Culver follows:]



Testimony of

**Nada Culver**

**Senior Counsel**

**The Wilderness Society**

Before

**House Select Committee on Energy Independence and Global Warming  
Hearing on Solar Energy Development**

September 24, 2009

Chairman Markey, members of the Committee and members of the House, my name is Nada Culver. I am Senior Counsel in the Public Lands Campaign of The Wilderness Society. The Wilderness Society's mission is to protect wilderness and inspire Americans to protect our wild places. For more than 70 years, and on behalf of our more than 500,000 members and supporters, we have worked to ensure that land management practices are sustainable and based on sound science so that the ecological integrity of the land is maintained. I direct the BLM Action Center, which tracks land use planning and policy, and is dedicated to helping the public effectively engage and participate in the processes that determine how our public lands are managed. We appreciate the leadership that Chairman Markey has already demonstrated in seeking solutions to the impacts of climate change through recently-passed legislation and through the ongoing efforts of this committee, including spotlighting the potential that solar energy represents for helping us to transition away from our dependence on fossil fuels.

Our wildlands and our human communities are threatened by global warming and our reliance on fossil fuels. We see solar energy development, and other sources of renewable energy, as an important part of responding to these threats, moving us toward energy independence and cleaner sources of energy. In order to make real progress, though, we also need to engage in other critical efforts to eliminate energy waste; to moderate demand through energy efficiency, conservation, and demand-side management practices; and to develop renewable energy technologies at a smaller scale, while keeping habitats and ecological connectivity intact.

Similarly, our public lands can play an important role in supporting renewable energy development, creating a sustainable energy economy and combating climate change. Renewable resource development is not appropriate everywhere on the public lands, however, and development that does occur on the public lands must take place in a responsible manner. This testimony will focus on some of the key considerations for The Wilderness Society related to solar energy development, including identifying appropriate locations and management strategies.

Secretarial Order 3285, issued by Secretary of the Interior Salazar on March 11, 2009 set the stage for a new approach to energy development on the public lands, focusing on development and transmission of renewable energy “from appropriate areas” – a thoughtful approach that we see reflected in the Department of the Interior’s approach to solar energy development and hope to see applied to other types of energy development on the public lands. Accordingly, this written statement will refer to elements of the Secretarial Order on Renewable Energy Development as references for discussing:

- Identifying and prioritizing locations for large-scale production, including already disturbed or damaged lands;
- Identifying transmission needs;
- Environmentally responsible development, including mitigation measures;
- Developing policy direction, adequate agency resources and funding initiatives needed to support a robust solar energy program;
- Cooperating with other agencies, governments and stakeholders.

Before proceeding to address these issues, however, it must be noted that good national energy policy in a warming world should include a discussion of other issues that DOI cannot be expected to tackle alone. The centerpiece of a national policy must be an economy-wide cap on global warming pollution that results in rapid and dramatic emissions reductions. Additionally, alternative energy resources such as energy efficiency measures, energy storage, demand response and distributed generation technologies must be evaluated as part of a region-wide integrated resource planning process. These resources should be considered and weighed equally with new generation in making a determination of need to ensure demand for low-carbon generation cannot be satisfied otherwise. This careful look would ensure that the nation does not miss other superior energy opportunities, sacrifice our nation’s precious lands and wildlife, or undermine critical efforts to rid the nation of dangerous dirty air and global warming pollution.

***Prioritizing locations for large-scale solar development and protecting sensitive resource areas:***

Secretary Salazar has committed the Department of the Interior to “identifying and prioritizing the specific locations in the United States best suited for large-scale production.” For the public lands, the Department has commenced a Programmatic Environmental Impact Statement (PEIS) to develop and implement a program for solar energy development, and has recently concluded a second round of scoping on Solar Energy Study Areas (SESAs) that will be considered for designation as Solar Energy Zones (SEZs) to be prioritized for large-scale development. The SESAs were developed based on energy potential, minimum size, proximity to existing

transmission, and suitability of terrain.<sup>1</sup> Further, the agency excluded from evaluation those lands considered to house “sensitive resources,” such as lands in the Bureau of Land Management’s (BLM) National Landscape Conservation System<sup>2</sup>, critical habitat for threatened and endangered species, areas with high known densities of cultural sites, visual resources, special recreation management areas, wildlife movement corridors, areas of critical environmental concern and areas managed to maintain wilderness characteristics.

The Wilderness Society supports this approach to identifying appropriate locations for development, which also acknowledges the many other values of the public lands and would recommend that the protection of the categories of sensitive resource areas identified above be required and expanded to include similar categories on lands managed by other agencies or states. Solar energy development involves long-term use of land, damage to natural resources, and precludes other uses, and so should be directed to lands that do not have other sensitive resources. Lands with wilderness characteristics, such as citizen-proposed wilderness, are an example of irreplaceable resources that should not be available for development of solar energy. These “sensitive resource areas” provide other economic, scientific, ecological and spiritual benefits such as recreation, habitats for vulnerable and endangered species, carbon sinks, and unique natural or cultural resources.

Further, the approach under consideration in the Solar PEIS is not only to identify lands to be prioritized for development as SEZs, but also to then limit development to these SEZs. This approach, when adopted, will evidence a commitment to responsible land management and give the Department of the Interior the tools needed to actively manage our public lands and ensure their ongoing ecological integrity. The Federal Land Policy and Management Act (FLPMA), directs the BLM to manage the public lands “in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values.” 43 U.S.C. § 1701(a)(8). Further, the BLM’s multiple use mandate for management of the public lands is defined as:

a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.

43 U.S.C. § 1702(c). FLPMA further clarifies that multiple use encompasses the idea that not all uses are appropriate in all places. *Id.* The SESAs are an accurate and common sense interpretation of applying the BLM’s multiple use mandate to a high-impact use such as large-scale energy development. In contrast, the Department’s approach to managing oil and gas development has relied on simply making lands available for leasing without considering other

<sup>1</sup> Suitable terrain was defined by areas with a slope of less than 5%.

<sup>2</sup> The “crown jewels” of the BLM lands, including Wilderness, Wilderness Study Areas, National Monuments, National Conservation Areas, Wild and Scenic Rivers, National Trails.

uses or strategically prioritizing lands for development. This lack of consideration has led to significant controversy and precluded thoughtful management of the public lands. Focusing on lands that do not have sensitive resources and are close to transmission will minimize the environmental damage and loss of other uses from large-scale solar energy development.

The Wilderness Society supports guiding large-scale solar energy development to disturbed lands, which may be on private or public lands. Abandoned mines, developed oil and gas fields, fallow agricultural lands, undeveloped real estate parcels, and other brownfields, which are not being restored to ecological function, provide opportunities for solar energy development without loss of other uses and values. In addition, revitalizing brownfields with renewable energy can create jobs, improve community health, remove blight, and increase local property values. These sites are often close to population centers and/or transmission, reducing the need for related development, and are already zoned for industrial uses.

Many private land owners and developers have seen the benefits of siting solar power on brownfields, as seen in the myriad of success stories. In Colorado, for example, the city of Fort Carson recently built 2 megawatts of photovoltaic panels on 12 acres of a former landfill. The project generates about 2.3% of Fort Carson's energy needs and won the Governor's Excellence in Renewable Energy Award for 2007.

Both the Environmental Protection Agency (EPA) and the BLM have begun to promote this idea. The EPA's "RE-Powering America's Lands Initiative" used National Renewable Energy Laboratory data to determine the renewable energy potential of every contaminated site that the EPA tracks. Every state in the nation has disturbed lands with high, developable renewable energy potential, and over 2 million acres of the tracked sites have utility-scale PV potential, while 3 million acres have Concentrated Solar Power potential. In fact, EPA/NREL estimate that as much as 970,000 megawatts of utility-scale potential are found on these sites.<sup>3</sup> The Arizona BLM is also conducting a specific process to identify lands that are both suitable for renewable energy development and require remediation or do not have other high resource values. The Restoration Energy Design Project is seeking to identify lands such as:

- hazardous material sites;
- brownfields;
- abandoned mines;
- former landfills, mineral sites or gravel pits;
- sites damaged or disturbed to the extent that restoration potential is limited; and
- sites that otherwise have very limited productivity due to a disruption of natural processes.

In other states, information could be gathered by seeking information from industry and the public, as well as from other federal and state agencies, to identify more of these lands for solar energy development. Further, these categories could also permit coordination with adjacent landowners, to establish coordinated management of lands so that there would be sufficient

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<sup>3</sup> Rob Lawrence, U.S. Environmental Protection Agency, *Renewable Energy on Previously Contaminated Lands*, Presentation to Energy in the Southwest Conference, July 13, 2009, Santa Fe, New Mexico.

acreage to support large-scale solar energy development and to ensure the opportunities on private land are fully considered. While the public lands provide an important location for energy development, they are not the only location and incentives for renewable energy development, including on brownfields, should encompass all land ownership.

The Wilderness Society has been promoting reuse of these sites for some time now. For example, the U.S. Conference of Mayors joined us in signing an open letter to the Congress calling for these opportunities to be incentivized.<sup>4</sup> We believe it would be particularly helpful to provide such an incentive in the Renewable Electricity Standard, so that utilities would be knocking on the door of our local municipal and county governments asking to invest their resources in revitalizing the local tax base by siting a renewable electricity project on an idle brownfield site. “Recycling” these types of lands would take pressure off development of undisturbed land, both public and private.

#### *Identifying transmission needs and locations*

Secretary Salazar’s Order notes the need to identify corridors for delivering renewable energy “in cooperation with other agencies of the United States and appropriate state agencies” and also to prioritize “appropriate environmental review.” Transmission lines and associated infrastructure have substantial environmental consequences, from direct destruction of habitat and wildlife mortality to habitat fragmentation and increased invasive species, as well as ruining scenic values. New lines can also indirectly facilitate an expansion in carbon-heavy electric generation by alleviating congestion on existing lines that serve coal-fired generation. *Importing Pollution: Coal’s Threat to Climate Policy in the Northeast.*<sup>5</sup> Consequently, locating solar energy development in proximity to existing transmission is most desirable, and is another strong argument for favoring the re-use of brownfield sites where much of the infrastructure for getting the electricity to market is already in place. New transmission lines, with their extensive footprint, should only be sited where they are truly needed, where they can support renewable energy and avoid sensitive resources as we detailed in a letter to Council on Environmental Quality Chair Nancy Sutley in March.<sup>6</sup>

#### *Mitigation measures*

Development of utility-scale solar power generation facilities will transform the lands upon which they are located and preclude most—if not all—other uses. As noted by the BLM, other uses of these sites “are unlikely due to the intensive use of the site for PV [photovoltaic] or CSP [concentrating solar power] facility equipment.” BLM Instruction Memorandum 2007-097. Thus, the paramount consideration should be siting large-scale solar in the right places.

BLM is obligated to manage the public lands to protect their varied natural and cultural resources. FLPMA requires the BLM to “minimize adverse impacts on the natural,

<sup>4</sup> Available at <http://wilderness.org/files/letter-to-Congress.pdf>.

<sup>5</sup> Available at [http://www.ucsusa.org/clean\\_energy/technology\\_and\\_impacts/impacts/importing-pollution.html](http://www.ucsusa.org/clean_energy/technology_and_impacts/impacts/importing-pollution.html). The study found that new policies or transmission construction that facilitates “[u]se of the excess capacity of existing coal plants to the west and south of the [Regional Greenhouse Gas Initiative] region—the equivalent of 15 new coal plants—could produce heat-trapping pollution three and a half times the cuts expected under the initiative.” (Pg. 1) Although similar analysis has not been conducted for the Western Interconnection, where much of the nation’s utility-scale solar potential is located, results would be similar in nature but not in magnitude.

<sup>6</sup> Available at [http://wilderness.org/files/Browner-transmission-letter\\_0.pdf](http://wilderness.org/files/Browner-transmission-letter_0.pdf).

environmental, scientific, cultural, and other resources and values (including fish and wildlife habitat) of the public lands involved.” 43 U.S.C. §1732(d)(2)(a). Further, NEPA requires consideration of measures to mitigate potential environmental consequences. 40 C.F.R. §1502.16. Therefore, in order for the BLM or other agencies to rely on mitigation to reduce potentially significant impacts, NEPA requires that environmental documents incorporate a firm commitment to the mitigation and discussion of the mitigation measures “in sufficient detail to ensure that environmental consequences have been fairly evaluated...”<sup>7</sup> NEPA defines “mitigation” of impacts (at 40 C.F.R. § 1508.20) to include:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
- Compensating for the impact by replacing or providing substitute resources or environments.

NEPA also recognizes that the best way to mitigate impacts is to avoid them altogether, which in the context of solar energy comes down to siting. Further, where mitigation is being developed, simply identifying mitigation measures, without analyzing the effectiveness of the measures violates NEPA. BLM must “analyze the mitigation measures in detail [and] explain how effective the measures would be . . . A mere listing of mitigation measures is insufficient to qualify as the reasoned discussion required by NEPA.”<sup>8</sup> NEPA also directs that the “possibility of mitigation” should not be relied upon as a means to avoid further environmental analysis. *Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations*.<sup>9</sup>

Consequently, for large-scale solar energy development, mitigation measures:

1. Must be **mandatory**, such that they are required to be included in each and every permit as long as certain circumstances are present.
2. Must be **based on credible science** to show they will be effective - NEPA’s hard look at environmental consequences must be based on “accurate scientific information” of “high quality.” 40 C.F.R. § 1500.1(b). Essentially, NEPA “ensures that the agency, in reaching its decision, will have available and will carefully consider detailed information concerning significant environmental impacts.”<sup>10</sup> The Data Quality Act and BLM’s interpreting guidance expands on this obligation, requiring that influential scientific

<sup>7</sup> *Communities, Inc. v. Busev*, 956 F.2d 619, 626 (6th Cir. 1992).

<sup>8</sup> *Northwest Indian Cemetery Protective Association v. Peterson*, 764 F.2d 581, 588 (9th Cir. 1985), *rev’d on other grounds*, 485 U.S. 439 (1988).

<sup>9</sup> Available on-line at: <http://www.nepa.gov/nepa/regs/40/40p3.htm> ; the U.S. Court of Appeals for the Tenth Circuit has found that the “Forty Questions” are “persuasive authority offering interpretive guidance” on NEPA from CEQ. *Davis v. Mineta*, 302 F.3d 1104,1125 (10th Cir. 2002).

<sup>10</sup> *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).

information use “best available science and supporting studies conducted in accordance with sound and objective scientific practices.”<sup>11</sup>

3. **Any proposed monitoring and adaptive management approaches must include specific standards and commitments** – Definitive standards, timing and details for actions that will be taken based on the results of monitoring and a discussion of BLM’s basis for relying on their success, including likely funding, must be set out. Further, such mitigation programs should also identify the existing condition of resources, standards for when management change will be triggered and the use of a “fallback prescription” where adaptive management is not suitable or funding for necessary monitoring is not sufficient.
4. **Address the loss of availability for multiple-use** – Since solar development preempts any other activities or uses, the BLM should address the effective loss of any lands approved for solar development from the public domain, including through both on-site and off-site mitigation. This mitigation should also compensate for the loss of other resources, values and uses of those lands, such as recreation, scenic vistas, wildlife migration corridors and habitat for other plants and animals.

IM 2008-204, which sets out BLM’s current policy for off-site mitigation, defines off-site mitigation as “compensating for resource impacts by replacing or providing substitute resources or habitat at a different location than the project area.” The guidance also acknowledges the priority of onsite mitigation, such that “[o]ffsite mitigation is supplemental to onsite mitigation and is used to enhance the BLM’s ability to fulfill its mission of providing multiple uses on the public lands, while ensuring its resource management objectives are met.” Further, like other mitigation measures, the agency must be able to show the mitigation will be effective. The guidance reiterates: “[w]hen proposed offsite mitigation is geographically distant from the project area, and particularly when it occurs on non-Federal land, the connection to resources for which the BLM is responsible should be clear.”

Key considerations for off-site mitigation should include:

- **Identification of uses, resources and values associated with the project site.**

Establishing the connection between off-site mitigation and the resources of the public lands will require detailed understanding and knowledge of the values and uses present on the project site before development occurs, such as wildlife habitat, various recreational uses (ranging from hunting to birdwatching to all terrain vehicle use) and scenic values. BLM should require that necessary inventory of the project site be completed prior to developing off-site mitigation measures.

- **A “no net loss” or a “net gain” requirement for resources and values.**

BLM should ensure that any loss of resources or values on a solar development site is compensated with the addition and protection of equivalent or better resources and values

<sup>11</sup> Treasury and General Government Appropriations Act for Fiscal Year 2001, Pub.L. No. 106-554, § 515. See also Bureau of Land Management, Information Quality Guidelines, available at [http://www.blm.gov/nhp/e/foia/data\\_quality\\_guidelines.pdf](http://www.blm.gov/nhp/e/foia/data_quality_guidelines.pdf).

off-site. For instance, backcountry hunting experiences would be re-established by identifying lands with suitable big game habitat and ensuring those lands are managed to maintain wildlife populations and protect a non-motorized experience. These lands might also be able to replace scenic values and hiking or horseback riding opportunities, depending on management. BLM should also make a determination about the value of the habitat to be impacted and adopt direction for mitigation requirements for the specific habitat types impacted. For example, for high quality habitat which is relatively scarce or becoming scarce on a national basis or in an ecoregion, BLM policy should ensure no net loss of in-kind habitat value.

Additions of lands and resources should equal or exceed the value of any resources or values which are lost. Additions could be gained through some combination of three primary mechanisms; however, requirements should ensure that the majority of mitigation efforts be focused on the first two mechanisms, with the highest priority given to the first mechanism:

- 1) Purchase of additional private lands to be put in the federal estate under conservation management to guarantee the maintenance of the equivalent or better values and resources lost on the project site, or
- 2) Additional conservation designations on existing federal lands which would protect the equivalent or better resources and values lost on the project site, or
- 3) Restoration and research efforts to improve the quality and quantity of equivalent resources and values off-site.

Mitigation for impacts to water resources could be addressed by purchase and retirement of water rights to offset groundwater pumping by the project.

- **Requirements for project developers to fund mitigation efforts based on the amount and value of the land impacted from development.**

Project developers should be required to make deposits to a mitigation fund based on the amount of land used for the project and the fair market value of that land. The funds should be required to be spent on the three mechanisms outlined above.

- **Requirements for project developers to mitigate the ongoing pressure for energy development on the public lands.**

Since project developers will profit from the development of solar energy on the public lands, they can also be obligated to lessen the future demands to be made upon these lands. Project developers can present proposals to achieve these goals by providing financial support for specific distributed generation efforts, energy efficiency measures, demand reduction programs, or equipment upgrades in the region. We recommend that developers be required to identify megawatts of demand mitigation that equate to a percentage of the megawatts they expect to generate.

- **A centralized body should be established to oversee the funds and maximize the effectiveness of their use.**

BLM should establish a centralized body comprised of BLM staff, and other federal and state agencies with expertise and interest to oversee the distribution of funds and maximize

the effectiveness of their use. This body should be required to take into consideration recommendations from the public in the distribution of funds.

- **Off-site mitigation should be required to take place in the same ecoregion as the project site.**

The World Wildlife Fund defines an ecoregion as a "large unit of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions".<sup>12</sup> Ecoregional health is critical for maintaining the health of individual ecosystems within the ecoregion. In addition to ensuring that off-site mitigation meets a "no net loss" requirement for resources and values lost on the project site, BLM should require that mitigation take place in the same ecoregion as the project site, to ensure the continued health of the overall ecoregion. In situations where availability of private lands for purchase and addition to the federal estate under conservation protection is limited (in Nevada, for example, where the vast majority of lands are already in the federal domain), additional conservation designations on existing BLM land, as well as restoration, research, and other mitigation measures, will be necessary.

***Developing policy direction, adequate agency resources and funding initiatives needed to support a robust and environmentally responsible solar energy program:***

Secretarial Order 3285 also directs the Department of the Interior to "establish clear policy direction for authorizing the development of solar energy on public lands." As evidenced by the Solar PEIS, the Department and the BLM do not currently have a robust program, but are in the process of developing a program that reflects both their goals to support renewable energy development and the multiple uses and values of the public lands. Policy direction such as identifying and prioritizing zones that are appropriate for large-scale solar energy development and then limiting projects to those SEZs is a central tenet of this policy and should be actively supported. Further, based on the agencies own regulations, uses like large-scale solar energy are better suited to a lease ("authorization to possess and use public lands for a fixed period of time." 43 C.F.R. § 2920.0-5(c)), and policy is still needed to develop a program and incentivize transition of right-of-way projects to lease forms once the program is developed.

We understand that the Department is endeavoring to simultaneously develop policy direction, identify SEZs, and analyze pending applications. We are truly impressed with the breadth and depth that has been achieved to date and encouraged by the direction in which it is proceeding.

In order to fulfill the vision that is set out in the Department's PEIS to date and in our recommendations, we also see a need for the agencies to have sufficient resources to manage large-scale solar energy projects through their life cycle – from environmental analysis, development of mitigation measures and permitting, through ongoing monitoring and adaptive management, and then restoration and reclamation. While federal agencies were provided with additional resources to permit oil and gas drilling on the public lands during the last administration, the solar energy program was not given similar attention. As such, the Department has the unique opportunity—and the significant challenge—of developing it from the ground-up. Additional resources will unquestionably be needed to extend the commitment of the federal agencies through the entirety of development projects and to empower the agencies to

<sup>12</sup> [http://www.panda.org/about\\_our\\_earth/ecoregions/about/what\\_is\\_an\\_ecoregion/](http://www.panda.org/about_our_earth/ecoregions/about/what_is_an_ecoregion/)

conduct thorough review and oversight as stewards of our public lands. We have been supportive of ensuring that the agencies have adequate resources in the past and will continue to do so.<sup>13</sup>

We also see the funding mechanisms of programs like the Loan Guarantee Program administered by the Department of Energy and the American Recovery and Reinvestment Act 1603 program administered by the Department of the Treasury as critical to jumpstarting our transition to clean energy. These programs have an important role to play in ensuring that good projects have the capital they need to start construction and begin delivering benefits of green jobs and low-carbon, renewable energy.<sup>14</sup> Renewable energy projects that have favorably completed environmental reviews and have shown a commitment to working with local communities, environmental groups, and other stakeholders to address issues should be prioritized to receive these monies. Similar incentives can and should be used to encourage development on brownfields and other disturbed lands. Recently-announced grants heavily favor wind projects; however, we hope to see more solar applicants receiving grants in future rounds.

***Cooperating with governments and stakeholders:***

Secretary Salazar's Order sets out a policy requiring agencies within the Department of Interior to work collaboratively with one another and with other "agencies, departments, states, local communities, and private landowners" and also directs the agencies to work with "individual states, tribes, local governments, and other interested stakeholders, including renewable generators and transmission and distribution utilities to identify appropriate areas for generation and necessary transmission." NEPA requires agencies "to consider environmentally significant aspects of a proposed action, and, in so doing, let the public know that the agency's decisionmaking process includes environmental concerns."<sup>15</sup> NEPA's requirements also highlight the interest in understanding environmental consequences and having the opportunity to submit meaningful comments. Seeking input from the wide range of interested and knowledgeable parties identified in the Order will assist agencies with gathering critical information, identifying areas of concern early on and addressing them, and improving projects, so that projects are more likely to be supported by a wider range of stakeholders. Two keys to achieving timely permitting and successful construction of solar energy and transmission projects are open and inclusive stakeholder participation and early consideration of siting opportunities and challenges. As we detailed recently in a letter to CEQ, prioritizing these strategies will offer the best chance of protecting the many resources and values on our public lands while getting desirable projects built.<sup>16</sup>

***Projects on the right path:***

There are several projects currently involved in the permitting process in the West that can serve as examples of opportunities to proactively seek solutions to potential concerns. Thorough environmental review will ultimately determine whether these projects are appropriately sited,

<sup>13</sup> E.g., Letter from Bill Meadows, President of The Wilderness Society, to House Appropriations Committee, July 8, 2008.

<sup>14</sup> For additional details of our support for these efforts, see Letter from Bill Meadows, President of The Wilderness Society, to Secretaries Chu and Geithner, September 23, 2009.

<sup>15</sup> *Utahns for Better Transportation v. United States Dep't of Transportation*, 305 F.3d 1152, 1162 (10<sup>th</sup> Cir. 2002).

<sup>16</sup> Letter from Bill Meadows, President of The Wilderness Society, et al. to Council on Environmental Quality Chair Nancy Sutley, September 21, 2009. Available at <http://wilderness.org/content/sign-letter-ceq-renewable-energy-nepa>.

but the positive elements of their approach will certainly improve the likelihood of their success. We wanted to highlight some of the positive aspects of pending large-scale solar projects.

**Sonoran Solar Project, Arizona:** A 375 MW solar thermal project proposed by NextEra Energy for development on public lands southwest of Phoenix, Arizona. NextEra has chosen a site with proximity to existing transmission, roads and other infrastructure. The site does not overlap with sensitive areas like BLM Areas of Critical Environmental Concern or lands proposed by citizens for wilderness protection. NextEra has maintained an open discussion with members of the environmental community, including participating in meetings to address issues.

**SunZia Transmission Project, New Mexico and Arizona:** Proposed by SunZia LLC as a dual-circuit, 500 kV transmission line intended to access wind resources in central New Mexico on its eastern terminus and electricity needs in the Tucson-Phoenix area on its western terminus. SunZia has been extremely proactive in reaching out to the environmental community to identify and address issues. SunZia initiated contact with the environmental community nearly a year before the official start of BLM's public scoping process, traveled to attend several meetings with the community, engaged in open discussion of issues and potential solutions, and made changes to their proposal to address some of the issues raised.

**NextLight Silver State North and South Projects, Nevada:** Two adjacent photovoltaic solar plants with a total capacity of 400 MW proposed by NextLight Renewable Power LLC on BLM lands southwest of Las Vegas, near the California border. NextLight has chosen a site that does not overlap with sensitive areas like BLM Areas of Critical Environmental Concern or lands proposed by citizens for wilderness protection. NextLight has maintained an open discussion with members of the environmental community, including participating in meetings to address issues.

**Solana Generating Station, Arizona:** A partnership between Abengoa Solar and Arizona Public Service (APS), Solana is a proposed 280-megawatt (MW) solar-trough generation plant. It will be built on privately-owned, previously disturbed land 70 miles west of Phoenix. The project has been embraced by the state, local communities, and environmentalists. The company has secured site approval from the state corporation commission and secured most of the permits necessary from the county. Yet the project's future is still uncertain. As the power purchaser, APS, has testified in the past, "If a long-term extension of the ITC is not granted, Solana will not be completed." Abengoa has indicated that it needs the investment tax credit—or the new federal treasury grant—to move this project forward. Abengoa is now in the process of applying for a treasury grant.

***Conclusion:***

The Department of the Interior has committed to an approach to managing large-scale energy development that will help the nation move away from its reliance on fossil fuels and ongoing contributions to global warming, and toward a clean energy economy, while truly valuing the many uses and resources of our public lands. The key elements of this strategy are identifying places that are most appropriate for large-scale solar energy development while simultaneously protecting the places that are not appropriate or needed for development, providing financial tools to incentivize responsible development, and proactive involvement of other interested and

knowledgeable parties. By adding mandates for strong mitigation measures, staff and other resources, full-cycle monitoring and management, and incentives for using disturbed lands and cooperating with non-federal land owners, the approach can be most successful. A robust program in this model would be able to increase the likelihood of timely approval of projects and decrease unacceptable environmental impacts and resulting controversy and opposition.

We would also note that the Secretarial Order provides for identifying additional policies and/or revisions to existing policies or practices needed, including possible revisions to the Geothermal, Wind, and West-Wide Corridors Programmatic Environmental Impact Statements and their respective Records of Decisions. We would strongly encourage the Committee to recommend that the Department take the opportunity to improve these policies and decisions, as well as those applicable to oil and natural gas development, to incorporate similar concepts that would provide for prioritized and strategic development, responsible mitigation, and cooperation and coordination with other governments and stakeholders. It is time we learn from our nation's past mistakes in managing energy development on our public lands.

The Wilderness Society appreciates the Committee's interest in responsible solar energy development and hopes to be of assistance in encouraging similar interest and action from the Congress and the agencies that manage our public lands.

The CHAIRMAN. And our next witness is Dr. Stephanie Burns. Dr. Burns is the President, Chairman, and Chief Executive Officer of Dow Corning. She is the recipient of the 2008 Commercial Development Marketing Association Award for Executive Excellence. We welcome you.

#### STATEMENT OF STEPHANIE A. BURNS

Ms. BURNS. Thank you very much. Good afternoon. And thank you, Chairman Markey and Representative Sensenbrenner, for extending an invitation to join today. It is an honor and a pleasure to be here.

As you know, America is at the dawn of a new energy era, a transformation that will provide us with more clean energy-producing options like solar, wind and other renewable energy sources.

Dow Corning is one of the world's leading producers of polycrystalline silicon which powers the solar industry. I know firsthand that America's energy transformation is inexorably linked to our Nation's economic and manufacturing future. Such a transformation will require that we forge a new path forward through Federal leadership, the investment and innovation of private industry, and integrated policy prescriptions that address each step in the renewable energy value chain, from education and workforce development to raw material and end-product manufacturing to deployment and market readiness. With forward-thinking leadership and management, this transformation could bring with it a whole new set of industries, hundreds of thousands of new jobs, a sustainable source of economic growth and a reduced carbon footprint that is good for our country and for our global environment.

Other nations have enacted aggressive policies to support the growth of the renewable energy industry. For example, China—as you mentioned—India and Germany offer large subsidies for solar manufacturing facilities. As a result, the U.S. global market share of solar manufacturing has dropped from about 45 percent to only 7 percent in 12 years. It is time for America to enact policies that will keep the solar industry here and at home.

With that in mind, let me thank you for including the alternative energy investment credit in the American Recovery and Reinvestment Act. This credit is a significant first step towards establishing new clean energy technology manufacturing jobs here in the U.S., and encouraging companies such as Dow Corning to manufacture solar and other renewable energy-related materials in America with the potential to create more than 315,000 jobs in construction, engineering, science, skilled trades and others. I hope that this credit can be made permanent in an energy bill now under development, or in any other tax extender packages, as it will propel America into an era of sustained renewable energy use and help put Americans back to work.

Dow Corning is already leading by example. We are one of the only companies in the world that is able to provide advanced silicon-based materials and services throughout the entire solar value chain, from solar cell and panel manufacturing, to modular assemblies, right on through the panel installations, and we are making significant progress.

Earlier this month we announced the commercial availability of a breakthrough solar cell encapsulation technology that improves performance of solar panels and effectively lowers the cost for a kilowatt hour of solar power, making solar power less expensive to both produce and to use.

In the past 4 years we have announced more than \$4½ billion in investments in solar technology, including last December's announcement of more than \$2.2 billion to increase polysilicon production, creating 1,800 construction jobs and more than 1,000 permanent jobs in the months to come, all of this to be put in America.

And we have begun construction on a new manufacturing facility for use in thin film solar production which will produce even more solar-related jobs and help attract other supply-chain investments to the U.S.

This is a start, but in order to truly implement the transformation which is before us, Dow Corning proposes a four-point plan to address the technical, legislative, regulatory, manufacturing, and workforce-related factors. America's ability to develop a thriving domestic renewable solar power depends on this.

First, we encourage Congress and the Obama administration to enact new Federal policies and regulations that will encourage the rapid growth of a viable renewable energy industry and consumer adoption of renewable energy, through Federal tax incentives for domestic manufacturing, a robust Federal renewable electricity standard and Federal interconnection and net metering standards.

Second, we advocate increased Federal funding for research and development to accelerate solar technology innovation in advanced solar manufacturing jobs.

Third, we support the need to develop a green-collar workforce by supporting training programs like the programs Dow Corning has cosponsored with local colleges in Michigan and in Tennessee.

Fourth, we need the Federal Government to lead by example in the implementation of clean technologies through procurement of onsite generation, building retrofits for energy efficiency, and new, green building standards.

Finally, but certainly no less important, Congress must ensure that new policies to reduce greenhouse gas emissions, such as carbon tax or cap-and-trade, do not inadvertently discourage growth in the manufacturing and production of renewable energy resources.

In closing, as I said earlier, America is at a dawn of a new energy era. My company is doing its part to encourage a climate of collaboration, creativity, and commitment to greener energy security. It is more than just smart business. As a global company, we know it is fundamental to protecting our Nation's competitiveness in the decades to come. Thank you.

The CHAIRMAN. Thank you, Dr. Burns, very much.

[The statement of Ms. Burns follows:]

**TESTIMONY BEFORE THE  
HOUSE SELECT COMMITTEE ON ENERGY INDEPENDENCE  
AND GLOBAL WARMING  
September 24, 2009  
Washington, DC**

**Dr. Stephanie A. Burns  
Chairman, President and Chief Executive Officer  
Dow Corning Corporation**

Good afternoon, and thank you Chairman Markey and Representative Sensenbrenner for extending an invitation to join you this afternoon; it is indeed an honor and my pleasure to be here.

As you know, America is at the dawn of a new energy era – a transformation that will provide us with more clean energy-producing options like solar, wind and other renewable energy sources. Dow Corning is one of the world’s leading producers of polycrystalline silicon, which powers the solar industry, I know firsthand that America’s energy transformation is inexorably linked to our nation’s economic and manufacturing future.

Such a transformation will require that we forge a new path forward through federal leadership; the investment and innovation of private industry; and integrated policy prescriptions that address each step in the renewable energy value chain from education and workforce development, to raw material and end-product manufacturing, to deployment and market readiness. With forward-thinking leadership and management, this transformation could bring with it whole new industries, hundreds of thousands of new jobs, a sustainable

source of economic growth, and a reduced carbon footprint that is good for our country and for our global environment.

Other nations have enacted aggressive policies to support the growth of the renewable energy industry. For example, China, India and Germany offer large subsidies for solar manufacturing facilities. As a result, U.S. global market share of solar manufacturing has dropped from 45 percent to only 7 percent in only 12 years. It is time for America to enact policies that will keep the solar industry here at home.

With that in mind, let me thank you for including the Alternative Energy Investment Credit in the American Recovery and Reinvestment Act. This credit is a significant first step towards establishing new clean-technology manufacturing jobs here in the U.S. by encouraging companies such as Dow Corning to manufacture solar and other renewable energy-related materials in America, with the potential to create more than 315,000 jobs in construction, engineering, science, skilled trades and many others. I hope that this credit can be made permanent in any Energy Bill now under development, or in any tax extenders package, as it will propel America into an era of sustained, renewable energy use, and help put Americans back to work.

Dow Corning is already leading by example. We are one of the only companies in the world that is able to provide advanced silicon-based solutions throughout the entire solar energy value chain – from solar cell and panel manufacturing, to module assemblies, right on through to panel installations. And we are making significant progress. Earlier this month, we announced the commercial availability of a breakthrough solar cell encapsulation technology that improves performance of solar panels and effectively lowers the cost per kilowatt-hour of solar power – making solar power less expensive to both produce and use.

In the past four years we've announced more than \$4.5 billion in investments in solar technology, including last December's announcement of more than \$2.2 billion to increase polysilicon production – creating 1,800 construction jobs and more than 1,000 permanent new jobs in the months to come. And we have begun construction on a new manufacturing facility for use in thin film solar production which will produce even more solar-related jobs and help attract other supply chain investments to the U.S.

That's a start. But in order to truly implement the transformation which is before us, Dow Corning proposes a four-point plan to address the technical, legislative, regulatory, manufacturing and workforce related factors that influence America's ability to develop a thriving, domestic, renewable – and solar – energy industry.

First, we encourage Congress and the Obama Administration to enact new federal policies and regulations that will encourage the rapid growth of a viable renewable energy industry and consumer adoption of renewable energy technologies – through federal tax incentives to spur domestic manufacturing, a robust federal Renewable Electricity Standard, and federal interconnection and net metering standards.

Second, we advocate increased federal funding for research and development to accelerate solar technology innovation and advance solar manufacturing capabilities.

Third, we support the need to develop a green collar workforce, by supporting training programs – like the programs Dow Corning is already co-sponsoring with Delta College in

Michigan and Austin Peay State University in Tennessee – as well as training partnerships with non-profit organizations, and Centers of Excellence at academic institutions nationwide.

Fourth, we need the federal government to “lead by example” in the implementation of clean technologies, through procurement of onsite generation, building retrofits for energy efficiency, and new, green building standards.

Finally, but certainly no less important, Congress must ensure that new policies to reduce greenhouse gas emissions, such as a carbon tax or cap-and-trade system, do not inadvertently discourage growth in the manufacturing and production of renewable energy sources.

In closing, as I said earlier, America is at the dawn of a new energy era. My company is doing its part to encourage a climate of collaboration, creativity and commitment to greater energy security. This is more than just “smart business” for Dow Corning. As a global company, we know it is fundamental to protecting our nation’s competitiveness in the decades to come. Our nation, our economy, our customers, our employees, and our citizens in the communities we serve deserve nothing less than our best effort. We look forward to working with each of you as we move to a low carbon future, greater energy independence and a new economy for America, based, in part, on harnessing renewable energy resources. Thank you.

The CHAIRMAN. And our final witness today is Dr. Gabriel Calzada. Dr. Calzada is an Associate Professor in the Department of Economics at King Juan Carlos University in Spain. He is also the author of the report "Study of the Effects on Employment of Public Aid to Renewable Energy Sources."

We welcome you, Doctor. Whenever you are ready, please begin.

#### STATEMENT OF GABRIEL CALZADA

Mr. CALZADA. Chairman Markey, Congressman Sensenbrenner, and members of the Select Committee, thank you for the invitation to testify today on the Spanish experience in renewable energies and, specifically, in solar energy production.

Spain, as you know, has become a world leader in the production of solar and renewable energy, thanks to a mix of political determination and a huge amount of subsidies. In the year 2004 Mr. Zapatero promised, and I quote, "a reorientation of the energy model towards renewables and particularly solar energy." And he added, quote, this is the model of the future, end quote. And we did it.

From the year 2000 to 2008, we went from having almost no megawatt in solar energy, to be one of the world leaders. How we did it? The way we did it is through subsidies, as I said, public aid and specifically primes. In the case of solar we went so far as giving 575 percent prime over the market price in the so-called feed-the-entire-system. In this way, we provided \$40 billion to the renewable industry and \$13 billion to the solar industry. So we are talking about an industry, the solar, that provides less than 1 percent of the electricity and gets committed 13 billion Euros to that industry.

Obviously, every Spaniard wanted to enter this business and we got waiting lists. We have a large waiting list from Spaniards wanting a license to produce solar energy; and, related to this, a lot of corruption. You may have read in the newspapers a lot of corruption arose because nobody wants to be at the end of the queue, everybody wants to be on the front.

But even worse than this has been the bubble, the renewable bubble and the solar bubble that was created. In order to understand the bubble, you just have to think that most of the jobs, the so called "green jobs" that has been created are an installation of those. So if you want to keep those jobs, you cannot maintain a level of subsidy, you have to increase it. You have always to increase it because you have to keep them working, so it means you have to keep them producing new plans. But if they produce new plants, you will have to subsidize more more electricity that is produced by those plans. In this way it is a bubble that grows and grows.

And the Spanish Government now has a lot of problems related with this bubble. Nobody knows exactly how to solve the problem.

Another big question is who pays for this, all these billions. The first thing a Spanish politician did is look to the consumer, but they thought this was not a good idea because the price of electricity would have to be increased quite a lot. Then they looked at taxpayers. But politicians do want to be reelected, and they

thought the taxpayers are also voters, and they dismissed this possibility.

The third possibility was the distributors of energy. And finally they obliged the distributors of energy to pay these high primes. However, the distributors said immediately, Wait a minute, if we have to pay these very high primes to the producers of renewables, but you, government, set the very low price in the electricity that we have to sell, we will go bankruptcy. And the government immediately said, Don't worry, what we will do is that we will repay you, we promise we repay you in 15 years, in 15 years from now when I am not going to be here anymore, another politician is going to repay you. And they encouraged the companies to do securitization, securitization of this debt.

However, since year 2007, the utilities have not been able to sell the securitization, these packages, in the market, and a lot of troubles have arose in the Spanish electricity market. And many many so-called "green jobs" has been fired since then, because the government had to change a little bit the subsidies to the solar industry.

Thanks to this scheme 50,000 green jobs have been created. However, if you take into account the huge amount of resources that I just mentioned that has been taken away from the rest of the economy and put into this sector, you can see that for every job that has been created, these same resources and the rest of the economy would have created 2.2 jobs for every job. So it means that, in fact, you are losing jobs and you are not creating them. For every solar megawatts that was installed, nine jobs were lost.

This is the sad experience that your President suggests should be taken as a model. I am sure that Spain has many many good things to show, many economic good things to show your country, but I believe as an economist that this policy related to renewables, specifically solar industry, is not one of them. Thank you.

The CHAIRMAN. Thank you, Doctor, very much.

[The statement of Mr. Calzada follows:]

**TESTIMONY BEFORE THE  
HOUSE SELECT COMMITTEE ON ENERGY INDEPENDENCE  
AND GLOBAL WARMING  
September 24, 2009  
Washington, DC**

**TESTIMONY OF GABRIEL CALZADA ÁLVAREZ, PHD**

Chairman Markey, Congressman Sensenbrenner and Members of the Select Committee, thank you for the invitation to testify today.

My name is Gabriel Calzada Álvarez. I am an Associate Professor at Universidad Rey Juan Carlos (King Juan Carlos University) in Madrid, where I teach Applied Economics at the Environmental Science Faculty. In March 2009 me and two colleagues from the same University, Raquel Merino Jara and Juan Ramón Rallo Julián, released our study on the Spanish experience with “green jobs” with the technical auditing help of José Ignacio García Bielsa, a professional with large experience in the electricity market. Our study (“Study of the effects on employment of public aid to renewable energy sources”) has been provided to the Committee.

**SUMMARY**

President Obama has made clear his intention to follow Europe’s lead in employing state intervention in the economy to “create” what are called “green jobs”, specifically as a path out of the current economic troubles. Europe’s experience actually suggests that this is precisely the wrong approach, and I appreciate the opportunity to comment for your hearing record on our research which put these claims to the test using official data.

Our study sought to answer the seminal question—what was the price of Spain’s attempt to lead the world in a clean energy transformation. Our research shows that that price was very high. Here are some highlights from our study:

- For every 1 green job financed by Spanish taxpayers, 2.2 jobs were lost as an opportunity cost.
- Only 1 out of 10 green job contracts were in maintenance and operation of already installed plants, and most of the rest of the working positions are only sustainable in an expansive environment related to high subsidies.
- Since 2000, Spain has committed €571,138 (\$753,778) per each “green job,”
- Those programs resulted in the destruction of nearly 110,500 jobs.
- Each “green” megawatt installed on average destroyed 5.39 jobs elsewhere in the economy, and in the case of solar photovoltaics, the number reaches 8.99 jobs per megawatt hour installed.

Spain has already attempted to lead the world in a clean energy transformation. But our research shows that Spain’s policies were economically destructive.

When the president of a country with a relatively low unemployment rate like the US decides to learn how to create jobs from a country like Spain with the highest unemployment rate among developed countries, it should be in a field where that country has a demonstrable track record of job creation. Unfortunately, this is not the case of job creation in Spain through public support for the renewable energy.

Spain might have some original and efficient policies to show the rest of the world but unfortunately renewables aid is not one of them.

### **Bubbles Burst**

In Spain, we are witnessing the logical conclusion of an unsustainable policy of government subsidies and mandates of uneconomic forms of Energy. The bubble is bursting. In this case, it is a bubble created by government policies requiring more and more revenue best described so well by former British Prime Minister Lady Margaret Thatcher: “the problem with socialism is that eventually you run out of other people’s money.” That is what is happening in Spain’s renewable energy business today.

And while small and localized bubbles have occurred throughout history because of many individuals making the same bad decision, the magnitude of potential problems is tremendously amplified when those decisions are sanctioned and encouraged by government largesse and misguided interventions in the market. Governments have a bad track record of picking winners and losers in markets, and in fact, generally pick economic losers because it lacks the necessary incentives to avoid mal-investment and loss of capital. This eventually results in the withdrawal of political and economic support for the government’s created market. The bubble bursts.

### **A SHORT HISTORY OF SPAIN’S ATTEMPT TO CLEAN THE WORLD IN A CLEAN ENERGY TRANSFORMATION**

Although what the president has called “new” energy sources such as wind and solar have been around for centuries, the idea of a broad state-financed regime supporting renewable energy in Europe dates back to 1997 (EU White paper “Energy for the future: renewable sources of energy”). The creation of jobs in the “renewables” industry emerged as one of the main justifications and focal points of the plan.

Ten years later, the Commission presented an energy and climate policy package that would “set the pace for a new global industrial revolution.” On January 23rd 2008, the very same day that the Commission proposed the package in the new directive, Commission President José Manuel Barroso said that the proposal would be “an opportunity that should create thousands of new businesses and millions of jobs in Europe. We must grasp that opportunity.”

The same idea was repeated, albeit with different tones, by various political leaders, giving fodder to a press release by the Commission that captured comments by its members under the title, “Boosting jobs and growth by meeting our climate change commitments.” Spain, the country with the greatest problem with Kyoto’s cap and trade agreement—having increased emissions more than 50% over the base year when the Spanish-committed target was 15%—saw renewables as a possible solution to its emission woes.

During the 2004 general election campaign the socialist party candidate, José Luis Rodríguez Zapatero, promised “a reorientation of the energy model (...) towards one that is more centralized, more diversified and safe, less wasteful and also more solidary” (meaning it requires payment by many into a system “for the common good” from which they achieve little benefit). It was a change

in energy policy that would take place—and this is paramount—“built on all renewables, and in particular, solar energy.”

Soon after approving a new Royal Decree, Prime Minister Zapatero defended the change from the existing energy model to his energy model “of the future”—which Spain would lead, using language similar to that now employed in the U.S.— and correlated his efforts in the promotion of renewables with the creation of a high volume of jobs in the renewable energy sector. History would partially prove him right.

#### **PRESIDENT OBAMA PROMOTES THE SPANISH MODEL**

On January 16th, 2009, president-elect Barack Obama visited an Ohio business that manufactures components for wind power generators. Under the watchful eyes of both factory workers and the press, Obama assured, amid deepening unemployment and the onset of one of the gravest economic crises in recent history, that renewable energy “can create millions of additional jobs and entire new industries.”

The president then defended his energy subsidy package by citing examples from other countries: “And think of what’s happening in countries like Spain, Germany and Japan, where they’re making real investments in renewable energy. They’re surging ahead of us, poised to take the lead in these new industries.” He repeated this reference to the Spanish model as a basis for his plan on several other occasions.

President Obama is correct in observing that Spain provides a reference for the establishment of government aid to renewable energy. No other country has given such broad support to the construction and production of electricity through renewable sources. The arguments for Spain’s and Europe’s 20-20-20 “green energy” schemes are the same arguments now made in the U.S., principally that massive public support would produce large numbers of green jobs. The question that we and my colleagues have tried to answer through extensive academic research is “at what price?”

#### **THE RENEWABLE ENERGY BUBBLE—HOW WAS IT CREATED?**

The way Spanish politicians have supported renewable energy production is the so-called feed-in price system or tariff. Under this scheme, distributors of energy pay the producers of renewable energy a regulated price above the market price, reaching more than 100% over market price in wind energy and over 500% in solar photovoltaic energy in the Spanish case. This system has led to a myriad of decrees by which politicians and bureaucrats have tried to find the price and other artificially created incentives that would stimulate renewable energies at the lowest possible cost.

Under those stimuli wind energy grew from 1,715 installed MW at the beginning of 2000 to 14,836 MW at the end of 2008. In the same period of time solar photovoltaic energy production grew from practically nothing at the beginning to almost 3,000 MW. The growing installed capacity produced a significant growth in related jobs: from a small number of workers to 50,200 equivalent jobs. Moreover, according to one of Spain’s largest trade unions only 9.58% of the contracted green jobs at the renewable sector were in the field of maintenance and operation, and 66.27% in construction, fabrication and installation. Therefore, the growth of the installed capacity meant more public aid but it also meant more contracted workers in fields like installation, construction and fabrication that can only be sustained by additional plants that in return require new public aid.

The feed-in price system and the bubble produced a deficit to the energy distributors (called the rate deficit) that the government promised to repay. The rate deficit (mainly produced by renewable subsidies) that started in year 2000 with 250 million Euros and in year 2008 was already 5 billion Euros (3.4 billion due to renewables), has now an accumulated amount of over 16 billion Euros (more than \$23 billion USD).

Given Spain's experiment with feed-in tariffs, I was very surprised to learn from the publication Greenwire that two US Congressmen, Representatives Bill Delahunt and Jay Inslee are preparing a similar feed-in tariff law for your country. Our experience shows this will be economically harmful for consumers of electricity and for the society as a whole. The only ones who benefit...and benefit handsomely.... are the corporate interests who are paid princely sums for their fashionable but inefficient energy.

#### **OPPORTUNITY COST**

Public investment in renewable energy cites job creation as one of its explicit goals, which, given the current economic crisis, suggests an intention of seeding a future recovery with "green job" subsidies. The problem with this plan is that the resources used to create "green jobs" must be obtained from elsewhere in the economy. Therefore, this type of policy tends to create not just a crowding-out effect but also a net destruction of capital insofar as the investment necessary must be subsidized to a great extent and this is carried out by absorbing or destroying capital from the rest of the economy.

The money spent by the government cannot, once committed to "green jobs", be consumed or invested by private parties and therefore the jobs that would depend on such consumption and investment will disappear or not be created. Moreover, if the electricity produced by these sources ends up costing more to consumers, economic damage is compounded.

Investment in green jobs will only prove convenient if the expense by the public sector is more efficient at generating wealth than the private sector. This would only be possible if public investment were able to be self-financing without having to resort to subsidies, i.e., without needing to absorb wealth generated by the rest of the economy in order to support a production that cannot be justified through the incurred incomes and costs. We have calculated that the total public subsidy in Spain, both spent and committed, totals 28,671 million Euros (€28.7 billion or appx. \$41.4 billion USD at present exchange rates), and sustained 50,200 jobs. In other words every green job the government program has tried to create has cost 0.571 million Euros (\$824,000 USD). This number should also be placed in the context of an economy that is less than 1/10th the size of that in the United States. (2008 Spain GDP \$1.378 trillion vs. \$14.29 trillion for US)

In order to know how many net jobs are destroyed or avoided—as opposed to "created or saved"—by a green job program, for each one that it is intended to create we use two different methods: with the first, we compare the average amount of capital destruction (the subsidized part of the investment) necessary to create a green job against the average amount of capital that a job requires in the private sector; with the second, we compare the average annual productivity that the subsidy to each green job would have contributed to the economy had it not been consumed in such a way, with the average productivity of labor in the private sector that allows workers to remain employed.

#### **JOBS**

Using Spain as a model, and optimistically treating data funded in part by the European Commission, we find, by the above mentioned two different methods, that for every renewable

energy job that the State manages to finance, 2.2 jobs are lost on average, or about 9 jobs lost for every 4 created, to which we have to add those jobs that non-subsidized investments with the same resources would have created. Thus, the study calculates that the programs creating those jobs resulted in the destruction of nearly 110,500 jobs elsewhere in the economy. Since 2000 Spain spent €571,138 to create each “green job”, including subsidies of more than €1 million per wind industry job.

#### **ENERGY**

Each “green” megawatt installed destroys 5.28 jobs on average elsewhere in the economy: 8.99 jobs lost per MW/h of photovoltaics, 4.27 by wind energy, and 5.05 by mini-hydro. (“mini-hydro” includes low-head and other inefficient forms of hydropower)  
These costs do not appear to be unique to Spain’s approach but instead are largely inherent in schemes to promote renewable energy sources.

The total over-cost—the amount paid over the cost that would result from buying the electricity generated by the renewable power plants at the market price—that has been incurred from 2000 to 2008 (adjusting by 4% and calculating its net present value [NPV] in 2008), amounts to 7,918.54 million Euros (appx. \$11.4 billion USD)  
The total subsidy spent and committed (NPV adjusted by 4%) to these three renewable sources amounts to 28,671 million Euros (\$41.35 billion USD at present exchange rates), as was already stated.

#### **WHO PAYS?**

To pay for this experiment, Spanish citizens must therefore cope with either an increase of electricity rates or increased taxes (and public deficit), as will the U.S. if it follows Spain’s model. The price of a comprehensive electricity rate (paid by the end consumer) in Spain would have to be increased 31% to repay the historic debt generated by this rate deficit mainly produced by the subsidies to renewables, according to Spain’s energy regulator.

Renewables consume enormous societal resources. In Spain, the average annuity payable to renewables is equivalent to 4.35% of all VAT collected, 3.45% of the household income tax, or 5.6% of the corporate income tax for 2007.  
The regulator should consider whether citizens and companies need expensive and inefficient energy—a factor of production usable in virtually every human project—or affordable energy to help overcome the economic crisis instead.

The Spanish system also jeopardizes conventional electricity facilities, which are the first to deal with the electricity tariff deficit that the State owes them. During this period, 2000 to 2008, renewable technologies remained the beneficiaries of new credit while others began to struggle, though this disparate treatment was solely due to subsidies, mandates and related programs. As soon as subsequent programmatic changes take effect, which has become necessary due to “unsustainable” solar growth, its credit will also cease.

Principally, the high cost of electricity affects costs of production and employment levels in metallurgy, non-metallic mining and food processing, beverage and tobacco industries.

The high cost of electricity due to the green job policy tends to drive the relatively most electricity-intensive companies and industries away, seeking areas where costs are lower. The example of the stainless steel manufacturer Acerinox, which exported its growth from Europe to Kentucky thereby

creating U.S. and not European manufacturing jobs, is just such a case. I am surprised that the United States, which has seen the benefits of lower electricity prices in attracting business investment and jobs from other countries, would be considering a similar course and expecting a different result.

#### CONCLUSION

The study offers a caution against a certain form of green energy mandate. Minimum guaranteed prices generate surpluses that are difficult to manage. In Spain's case, the minimum electricity prices for renewable-generated electricity, far above market prices, wasted a vast amount of capital that could have been otherwise economically allocated in other sectors. Arbitrary, state-established price systems inherent in "green energy" schemes leave the subsidized renewable industry hanging by a very weak thread and, it appears, doomed to dramatic adjustments that will include large unemployment, loss of capital, dismantlement of productive facilities and perpetuation of inefficient ones.

These schemes create serious "bubble" potential, as Spain is now discovering. The most paradigmatic bubble case can be found in the photovoltaic industry. Even with subsidy schemes leaving the mean sale price of electricity generated from solar photovoltaic power 6 times higher than the mean price of the pool, solar failed even to reach 1% of Spain's total electricity production in 2008. The energy future has been jeopardized by the current state of wind or photovoltaic technology (more expensive and less efficient than conventional energy sources). These policies will leave Spain saddled with and further artificially perpetuating obsolete fixed assets, far less productive than cutting-edge technologies, the soaring rates for which soon-to-be obsolete assets the government has committed to maintain at high levels during their lifetime.

This proves that the only way for the "renewables" sector—which was never feasible by itself at this large scale on the basis of consumer demand—to be "countercyclical" in crisis periods, or lead a state out of economic difficulty—is also via government subsidies which of course is a problematic approach. These schemes create a bubble, accelerated as soon as investors find in "renewables" one of the few profitable sectors while when fleeing other investments. Yet it is axiomatic, as we are seeing now, that when crisis arises, the Government cannot afford this growing subsidy cost either, and finally must penalize the artificial renewable industries which then face collapse.

In sum, I would urge the Committee to closely investigate the experience that other nations have had with renewable energy schemes as we have done with our analysis of the Spanish model. Deliberately pursuing more expensive and less efficient energy in order to create green jobs has been the source of social harm and net job destruction, and many citizens of a nation are hurt when such policies are pursued.

The reality of renewable energy economics has forced the Spanish government to admit some of our findings at the introduction to the Royal Decree of April the 30th 2009 where it stated that the rate deficit, mainly caused by the feed-in-tariff system to support renewable energies, "is deeply harming the system and puts at risk not only the financial situation of the electric sector companies' but also sustainability of the system itself. This disadjustment turns out to be unsustainable and has grave consequences since it deteriorates the security and financial capacity of the investments necessary for providing electricity at the levels of quality and security the Spanish society demands."

The bubble bursts.

Some in the investment community already know this. In a 16 April, 2007, *Portfolio.com* article entitled "Behind the Green Doerr," the investment strategy of one of America's most aggressive investors in alternative energy, the venture capital firm Kleiner Perkins, was discussed:

Asked if greentech could repeat the dotcom crash, Doerr admits, "It's possible." He pauses and rubs his forehead before repeating, "It's possible."

Kleiner Perkins partner Ray Lane, a sage 60-year-old, goes further. "A bubble? You can almost count on it," he says. "Bubbles are common. They end badly for those who come in late. For those who come in early, it's not that bad." Lane thinks Kleiner Perkins' greentech portfolio has big, long-term winners in it. But he predicts that alternative energy will get overheated and others will undoubtedly go up in flames. "If the bubble develops out of a whim," he says, "then shame on investors. They need to get burned."

Thank you.

The CHAIRMAN. Now I will turn and recognize the gentleman from Oregon, Mr. Blumenauer.

Mr. BLUMENAUER. Thank you very much, Mr. Chairman, for your courtesy. I appreciate the interest from a number of our witnesses dealing with our current tax policies. And as a member of the Ways and Means Committee, I am very interested in our being able early in the game to extend the investment tax credit, working with you, and welcome any suggestions or assistance to make sure that investment funds that include tax-exempt entities are in fact eligible, so we can dramatically increase the pool of investment that is available—which seems to me to be very common sense and would have effectively no economic impact as far as the Federal Government is concerned, but open up a pool of capital.

I was interested—and Mr. De Rosa or others might have some information for us about the effectiveness of the various tax credits as opposed to using a direct grant. You mentioned the effectiveness, where you are not paying a premium to other investors, you are not having as much complication in terms of accountants and attorneys, some of whom are my best friends—I have nothing against them—but if there would be a way that you might be able to help us clarify the impact. And I am not expecting that you have something here that you can pull out of your briefcase, but if you could help us just generate information about what the difference is for projects that you are involved with, with the grant versus tax credit; at a minimum, maybe some suggestions that we might simplify the tax credit application as we move forward, I would appreciate it.

I do appreciate Dr. Burns' notion about the Federal Government leading by example, as the largest consumer of energy in the world—the Department of Defense or GSA. There are lots of things that potentially we could work on together.

I was interested, Dr. Calzada, as I am listening to your comments and I am looking at information that we have been provided, we find that the United States National Renewable Energy Lab, which we think is pretty reputable and straightforward, repudiates your report, suggesting it lacks transparency in reporting statistics, fails to compare renewable energy technologies with comparable energy industry metrics. It fails to account for issues such as the role of government in emerging markets, fails to account for the success of renewable energy exports in Spain, fails to account for the fact that renewable energy deployment creates additional indirect jobs in communities where renewables are being deployed and produced.

I am from a community that benefits from one of your renewable energy companies that has its American headquarters in Portland, Oregon.

But I would like to focus on one element that concerns me. An account of your report in the Wall Street Journal says, and I quote, "The study doesn't actually identify those jobs allegedly destroyed by renewable energy spending." Could you elaborate on specifically what jobs were destroyed and provide the committee with a list of them?

Mr. CALZADA. Yes, sir. Well, the first or the second—

Mr. BLUMENAUER. A list of the jobs that are destroyed.

Mr. CALZADA. About the NREL, this agency, this State agency, what they have criticized, they criticize us for using consensus economics about the crowding-out effect. They criticize us for not speculating about this year or future years. But it turns out that this year has been very bad for green jobs. Many have been fired.

They criticize us for not speculating about hypothetical export sales, when the reality is that we have taken them into account, we have incorporated them. We looked at what is and what was, but an export was part of it. And they criticized us specifically for—

Mr. BLUMENAUER. Excuse me, Doctor. The question I asked you was: What are the jobs that were destroyed?

Mr. CALZADA. What are the jobs?

Mr. BLUMENAUER. Yes, what are the jobs? Do you have a list of the jobs that were destroyed?

Mr. CALZADA. The jobs destroyed are 2.2 jobs for every job created, because you took the resources away. This is an opportunity cost analysis, this is a real-world analysis, and it is a way the companies do their analysis.

The other way of doing it, as NREL suggests, is using a methodology that was designed for central planning, economic central planning, this methodology. You might want one or the other. But ours is a real-world methodology and shows that for every job, 2.2 jobs were destroyed. If I take all your resources away that you use for your staff, you cannot hire your staff.

Mr. BLUMENAUER. My time is expired. I would appreciate it if you would provide to the committee—I don't want to put you on the spot and limit you just to a minute or two—if you could provide to the committee a list of the jobs in Spain that were destroyed by virtue of this, we would appreciate it. Thank you very much.

Mr. CALZADA. Congressman, you will have to ask this to the Spanish trade unions or to the Spanish Government. I can provide you with what has happened, with what has been the reality. How many jobs—this is standard economic procedure—how many jobs would have been created in the rest of the economy if we wouldn't have taken the resources away from the economy. It is very standard, and I am sure you understand.

Mr. BLUMENAUER. Thank you, Mr. Chairman.

The CHAIRMAN. The gentleman's time is expired. The Chair recognizes the gentleman from Washington State, Mr. Inslee.

Mr. INSLEE. Thank you. Excuse me.

The CHAIRMAN. The gentleman can have as much as time as he would like.

Mr. INSLEE. Thank you. I am most appreciative. I am very embarrassed because I can't recall which is—and I missed your testimony—the folks from the NRDC; is there someone from NRDC here? The Wilderness Society, excuse me. And that is Ms. Culver. Thank you very much. My apologies.

I just want to ask you a question. I have read your testimony, I just missed your name. But I have actually been reading your testimony, and you were talking about having a no-net-loss policy on a variety of characteristics on Federal land for habitat, for recreational activities, those kind of things. I just wonder if you could address to what extent you think we are doing that in the current

permitting process and how you would suggest we move forward to, in fact, effectuate that idea?

Ms. CULVER. I don't think it has been explicitly laid out in the permitting process. I think it has been happening; it may be happening in an informal way. More of the permitting process to date has focused on the siting issues where we have been able to have input about relocating or redesigning projects. It is coming up more in California already, I would say, where we are having more anticipated losses of habitat that we can quantify. So I haven't seen it happening to date.

The BLM has some internal guidance on both onsite and offsite mitigation that is very broad and allows them to design offsite mitigation policy that can take into account a myriad of ways to— as long as they identify the values that are being lost, be it habitat or recreation opportunities, they can design ways to do the mitigation. It could be done through a fund that was created as part of a project, it could be done by identifying additional lands that could be acquired for the agency to manage. It could also be done at a level of identifying similar areas that could be protected or managed specifically for a lost resource.

One of the analogies that I had heard was for instance when FERC permits dams, they also require an applicant to build boat ramps so that the recreational opportunities can be replaced. Now, it doesn't fit quite as well for solar energy, but that type of model I think could work.

Mr. INSLEE. So is the Bureau doing that at least to some degree now? Are they looking to mitigate some of these?

Ms. CULVER. They are not doing it at this point, that I have seen, but I talk to them a lot and they are thinking about how best to do it. And they could use some direction about how to move forward with using this very broad guidance they have on mitigating impacts, which, as you can imagine, is extremely broad.

Mr. INSLEE. Thank you.

Dr. Calzada, I read some criticisms that I had proposed essentially a Feed-in Tariff—we use a different name on this side of the water, but we will use this name because it is one you have used for the moment—suggesting that it was unwise for us to pursue, that since Spain had had this bubble developed. And I am not the total expert on the Spanish system, but I think that our proposal has learned from the Spanish experience.

We have in our proposal incorporated some measures that would prevent a bubble. One, a step-down of the price to take into consideration the economics of the situation. I think our proposal has a more realistic time frame as far as the rate of acceleration. I would characterize the Spanish acceleration, as you have to some degree, as precipitating a bubble that was unsupportable and just the rate of acceleration was too great. And in our legislation we have sought to learn from that experience, build in some safeguards.

And I think looking at the German experience, we can succeed in this. The Spanish experience I don't think should be taken as, you know convicting a Feed-in Tariff for all time and should never be pursued; it is just that you need to design it correctly. That is what I would take from the Spanish experience.

So if you want to comment on that, feel free. Is that really what the lesson should be? We should show some care when we design a Feed-in Tariff system.

Mr. CALZADA. I would say that what has started is the Spanish case, obviously. And as long as the other cases, other new cases, are similar to our case, the results should be very similar to the one. The warning of my team, of my researchers, is this.

Mr. INSLEE. So just to let you know, at least from my review, I think the NREL research is credible. It is the one we will be looking to to guide us in this regard. And I think they have concluded that your research, although I am sure sincere, was not necessarily the gold standard on evaluating this issue. And we are going to be following their conclusions and going to be moving forward with this.

By the way, the Chinese are now looking. They have indicated they will be adopting a similar policy. This has been spectacularly successful in many places in the world, not the least of which is Germany, and I hope that we will be able to pursue this. Thank you.

The CHAIRMAN. I recognize the gentleman from Oregon, Mr. Blumenauer.

Mr. BLUMENAUER. Thank you, Mr. Chairman. I appreciate Mr. De Rosa's point about the Cash for Clunkers. I found myself voting against that, even though I think it is probably a nice thing to do. But tripling that program when we didn't know what we were penalizing gave me pause.

I am wondering if you have some thoughts about how we rebalance the equities in terms of replacing that money? Do you have any targets as subsidies for other types of energy? Anything come to mind to put the money back in the bank?

Mr. DE ROSA. I appreciate the question. I have not looked into that. We would be happy to look into it and see if we can come up with some ideas for your consideration.

Mr. BLUMENAUER. Well, let me elaborate, because we have got three witnesses who are very much in the business of trying to develop an American presence in one of the most rapidly growing areas of economic activity globally, which the majority of us on the committee think is critical to the survival of the planet, the way that we know it, and our economic competitiveness.

A recent Environmental Law Institute study suggests that—well, it didn't suggest, it found that the United States provide fossil fuels with about 2½ times the subsidy of renewables.

Any thoughts about sort of rebalancing the playing field here so that we aren't in the position—which my friend Mr. Sensenbrenner talked about—in terms of picking wilderness and losers, but trying to promote sustainable evolution, particularly of emerging important technologies for the future?

Ms. BURNS. I would just support the concept that you are putting forward. I mean, we sell our starting material to almost all of the manufacturers in the value chain. Over 65 percent of what we make goes offshore to someone in Asia or Europe, or someplace else, to convert into the finished module. Then it comes back onshore, and these guys install it.

And I think anything we can do, number one, to grow the market demand for solar and renewables in America, shift from fossil to incentivizing this growth, and secondly, attract the solar manufacturers in the value chain to this country, those two things to me are a winning combination.

Mr. BLUMENAUER. Any further thoughts?

Mr. KLINE. I would offer, sir, that just one way of thinking about it is looking forward, as we seek to decarbonize the entire economy, one way of looking at evaluating the need for incentives would simply be on carbon content that would naturally move you towards investments in clean energy.

Mr. DE ROSA. If I could echo that, we consider ourselves market participants. And this committee has documented the consequence of climate change. The—I will say simple, it is the most difficult thing—but is to account for the externalities. And then you are not picking winners and losers. What you are doing is you are making an economy more efficient.

Right now our economy is not efficient. We are using too much energy because the true cost of that is not accounted for. So that is the challenge, is to put a price on carbon. I mean, I would argue that of all of the alternatives out there to reduce carbon emissions, the one that is most proven is renewables.

[2:36 p.m.]

Mr. DE ROSA. And we are just starting in things like carbon sequestration. So I would say that it is renewables that is actually the market clearing price for what the true cost of carbon reduction is. Now, you have a difficult task of stepping into 200 years of precedent and trying to figure out how to make that right, given the hand that we are dealt, but to me it is the—it is not—framing it is not difficult.

Mr. BLUMENAUER. Thank you very much.

The CHAIRMAN. The Chair recognizes the gentleman from Washington State Mr. Inslee.

Mr. INSLEE. Thank you.

I am very appreciative of the emphasis to make sure we get this money taken out of a renewable account restored. I know the Speaker is totally committed to this. I think we all up here are committed to this. I spoke to the Chief of Staff of the White House last week. They are committed to this. We are going to be diligent in making sure that happens.

I have a question about the cost of solar power has declined on a real basis with increase in volume in a fairly consistent level and gradient. Is there any reason to believe that that will not continue at that same gradient per volume? Is there some hope that it will actually go down faster? Can you give us any predictions in that regard, or thoughts?

Ms. BURNS. Yeah. The cost is declining with volume and with investment in research that is showing how to make these cells more and more efficient. And our view of it is a linear line. What will help is if we do increase demand, and that increases significantly and exponentially, then those costs should go down even greater than the linear line today, because you are going to start to get some efficiencies of scale and more investment in new technologies. You have seen this in the electronics industry as we become more

and more efficient in semiconductors and other things. So I anticipate that would happen. And you have seen great changes.

I just read the Department of Energy payback analysis, which was from 2004. Their assumption in that analysis was a 12 percent efficiency cell. People are up to 16, 18 percent, and then film is even higher than that. So I would anticipate any time you put this much research investment into a field, you are going to continue that trend.

Mr. INSLEE. Of course, the Boeing subsidiary, Spectra Lab, is even higher than that, but they are the world leader. I want to get the parochial local plug in that regard.

One of the attractions of the feed-in tariff, I think, is that it has an incentive that is appropriate to the state of a given technology. A renewable energy portfolio we have is a great tool, we are going to adopt it, but it is really sort of a one price for all technologies, and technologies are at different levels of development. So it really is an incentive for the next most affordable renewable energy, not the second most affordable energy. Right now, frankly, wind is still cheaper in most places than solar.

One of the benefits of a feed-in tariff is that it provides an incentive for multiple technologies appropriate to the level of maturation of that particular technology, and this has been successful in places that have done that. By the way, governments have been successful in ramping down that price. I was talking to a solar cell manufacturer in Dresden, Germany, last year, and he was tearing his hair out because the German Government was forcing down the price. That was appropriate to do with increasing scale and decreasing cost.

Is that a fair assessment? Is that a virtue we should pay attention to, move forward with the feed-in tariff? Any thoughts in that regard?

Mr. DE ROSA. Sure. The best—I think the biggest advantage of a feed-in tariff is its predictability. You know what the price is. I think we need to be careful about where we set that, and, in fact, the California Public Utility Commission is grappling with that issue right now. They have issued a report that is recommending a feed-in tariff for a certain category of renewables. I believe it is up to 10 megawatts with another caveat for 20, and they are inviting comments on how to set that price.

So I think that the—so far what we have done in the United States—and Steve Kline can speak to this—is we have had a competitive process where we have an RPS, and people like us bid competitively to meet that demand. I think that that has been slower than people's expectations. And so something like a feed-in tariff carefully drafted, I think, could address that.

Mr. INSLEE. Let me tell you, here is my concern. My concern is if we rely exclusively on the renewable energy standard, it will develop ultimately the next technology in line for cost quite effectively, which, frankly, is wind at the moment in most places, but it will not in a time-sensitive manner develop the second, third and fourth technologies in line of maturation. And it is clear to me that we are going to have to have technologies three, four and five to get to that 80 percent reduction by 2050 that we need. So I believe that it is imperative that we adopt another tool that will jump-

start numbers 2, 3, 4 and 5, that I believe this is really the best mechanism for doing that.

The alternative is to continue with our RES, and 10 years from now we will get to technologies 2, 3, 4 and 5. But we don't have 10 years to wait in that regard. We have to start now on all of these. So I will be looking to your advice on how to pursue that, and I hope that we do so.

Thank you.

The CHAIRMAN. The gentleman's time has expired.

The Chair will recognize himself for a round of questions. And first I ask unanimous consent to have included in the record correspondence with the Department of the Interior and the Department of Energy on solar development, and ask for unanimous consent that these letters be included in the record. Without objection, so included.

[The information follows:]

EARL BLUMENAUER, OREGON  
 JAY INSLEE, WASHINGTON  
 JOHN B. LARSON, CONNECTICUT  
 STEPHANIE HERSETH SANDLIN, SOUTH DAKOTA  
 SHAMUS CLAYTON, MISSOURI  
 JOHN J. HALL, NEW YORK  
 JOHN SALAZAR, COLORADO  
 JACKIE SPEER, CALIFORNIA

F. JAMES SENSENBRENNER, JR., WISCONSIN  
 RANKING MEMBER  
 JOHN B. SHADOCK, ARIZONA  
 CANDICE MILLER, MICHIGAN  
 JOHN SULLIVAN, OKLAHOMA  
 MARSHA BLACKBURN, TENNESSEE  
 SHELLEY CAPITO, WEST VIRGINIA

ONE HUNDRED ELEVENTH CONGRESS

**Select Committee on  
 Energy Independence and Global Warming  
 U.S. House of Representatives  
 Washington, DC 20515**

EDWARD J. MARKEY, MASSACHUSETTS  
 CHAIRMAN

July 16, 2009

The Honorable Ken Salazar  
 Secretary  
 Department of the Interior  
 1849 C Street, NW  
 Washington, DC 20240

Dear Secretary Salazar,

In preparation for an upcoming hearing, I write to request information on your recent announcement of fast track initiatives to develop solar resources on public lands.

As you know, I am an ardent supporter of developing renewable energy resources which will create clean energy jobs and reduce our dependence on foreign oil. Some of our Nation's best areas for developing renewables are in the West. In particular, electricity generated from solar resources has demonstrated a great potential to meet a significant portion of our nation's electricity needs and is becoming increasingly cost competitive with other generation resources. As such, I appreciate the Department of the Interior's (DOI) initiatives to help expedite the development of solar energy, while continuing to properly address and mitigate environmental and land use concerns. According to a DOI press release, the Bureau of Land Management (BLM) has received 158 active solar applications with a total capacity of 97,000 megawatts of electricity, which if fully developed would nearly cover peak electricity demand in *all* of the Western Interconnection.

As I understand, one particular initiative the Department of Interior is undertaking will have federal agencies work in tandem with western leaders to identify tracts of U.S. public lands in the West that can serve for solar energy development. In particular, twenty four Solar Energy Study Areas have been identified on Bureau of Land Management lands for possible large-scale solar development. These Solar Energy Study Areas, located in Arizona, California, Colorado, New Mexico, Nevada and Utah, would be fully evaluated for their environmental and resource suitability for large-scale solar energy production in order to allow a more efficient process for permitting and siting

solar energy, while continuing to properly address environmental concerns and eliminate sensitive wilderness and conservation lands from consideration. To accelerate the environmental evaluation of potential solar energy development, I am aware that DOI also will expand the Solar Programmatic Environmental Impact Statement, to analyze the potential impacts of utility-scale solar energy development on public lands in the twenty four Solar Energy Study Areas.

The Select Committee is interested in obtaining more information on the process for developing solar on public lands, the potential for solar generation, and the methods being implemented to address and mitigate environmental and land use concerns in the Department of Interior's solar development initiatives. The Select Committee requests responses to the following questions on solar development on public lands in the West.

1. How many megawatts of new solar resources can we expect to be developed on public lands through DOI's new procedures?
2. What criteria have been developed to identify the best areas of solar potential factoring in potential environmental conflicts? Was uniform criteria applied to the creation of these zones? What are some examples of the environmental factors (such as effects on wilderness and wildlife) that have been considered? What biological objectives have been designed to proactively sustain wildlife?
3. Is renewable energy development on BLM lands analyzed differently than oil and gas development?
4. Does DOI need additional authority or resources in order to help get efficient solar resources developed on public lands?
5. What is DOI's expedited timeline for processing solar applications and have interim milestones been developed? Has the DOI examined the deadlines associated with the Treasury's Grant program eligibility in forming timelines for processing applications? Is there sufficient time to conduct the proper environmental reviews in light of external deadlines?

Thank you for your assistance and cooperation in responding to this request. Should you have any questions, please contact Morgan Gray or Partha Malvadkar of the Select Committee staff at 202-225-4012.

Sincerely,

Edward J. Markey  
Chair



THE SECRETARY OF THE INTERIOR  
WASHINGTON

SEP 08 2009

The Honorable Edward J. Markey  
Chairman, Select Committee on Energy  
Independence and Global Warming  
House of Representatives  
Washington, DC 20515

Dear Mr. Chairman:

Thank you for your letter of July 16, 2009, regarding the Department of the Interior's initiatives to develop solar energy resources on public lands. I appreciate your support of the Department's efforts to develop renewable energy resources in a thoughtful manner that conserves the environment while building a solid foundation for a clean-energy economy. I regret that our response was not prepared prior to the hearing you held on July 30, 2009. Please contact me if the Department can assist in any way as you and your committee consider clean energy legislation going forward.

The following answers are provided to your questions about the process and potential for solar energy development on public lands:

*1. How many megawatts of new solar resources can we expect to be developed on public lands through the Department's new procedures?*

The Bureau of Land Management is processing 158 geographically distinct applications for solar energy development that have a potential generating capacity of approximately 97,000 megawatts. Not all of these projects will be permitted and built but many of them will. Of these active applications, the BLM is working on several applications that have the potential to reach a decision stage by December 2010. These several "fast-track" applications represent approximately 4,500 MW of generating capacity.

*2. What criteria have been developed to identify the best areas of solar potential factoring in potential environmental conflicts? Was uniform criteria applied to the creation of these zones? What are some examples of the environmental factors (such as effects on wilderness and wildlife) that have been considered? What biological objectives have been designed to proactively sustain wildlife?*

The BLM is preparing a Solar Energy Programmatic Environmental Impact Statement to assess, at the broad-scale, the development potential of 29.5 million acres of public lands in Nevada, Arizona, California, Colorado, New Mexico, and Utah that have high solar

energy potential. Within the 29.5 million acres, the BLM has further identified 24 solar energy study areas for detailed analysis in the PEIS. These solar study areas, which contain 670,000 acres, were selected based on ongoing statewide and regional studies, including California's Renewable Energy Transmission Initiative and the Western Governors' Association's Western Renewable Energy Zone and Transmission Study.

The solar energy study areas have high solar energy potential and a low potential for known resource conflicts. Only those lands with excellent solar resources (greater than 6.5 solar insolation); suitable slope (less than 5 percent); proximity to existing roads, transmission lines, or designated corridors; and containing at least 2,000 acres of BLM-administered public lands were considered for solar energy study areas. To address known environmental concerns, the following categories of lands were excluded from the solar energy study areas:

- National Landscape Conservation System lands, with the exception of lands in the California Desert Conservation Area that do not have a separate NLCS designation;
- Threatened and endangered species designated critical habitat;
- BLM-designated Areas of Critical Environmental Concern and Desert Wildlife Management Areas;
- Areas designated as Visual Resource Management Classes I and II;
- Special Recreation Management Areas;
- Areas allocated in existing land use plans to maintain wilderness characteristics;
- Wildlife movement corridors;
- Areas where the BLM has made a commitment to take certain actions with respect to sensitive species habitat;
- Back-country byways;
- Areas of known Tribal concerns;
- Areas with a known high density of cultural sites; and
- Areas designated in existing land use plans for right-of-way avoidance or exclusion.

Large-scale solar development in the arid West could require fundamental reallocation of land and water resources and have significant local and regional impacts. Land used for utility-scale solar development becomes essentially unavailable for any other land use for the long term. These impacts and tradeoffs are being assessed in the Solar PEIS and through the site-specific NEPA that will be conducted for each project proposal. These complementary broad-scale and site-specific analyses will provide the basis for making sound, science-based decisions.

*3. Is renewable energy development on BLM lands analyzed differently than oil and gas development?*

All potential public land uses, including renewable energy development and oil and gas development, are evaluated through the BLM's land use planning process, which includes thorough public involvement and environmental analysis in accordance with

NEPA. Subsequent NEPA reviews examine potential impacts from site-specific proposals.

*4. Does the Department need additional authority or resources in order to help get efficient solar resources developed on public land?*

The BLM has established Renewable Energy Coordination Offices to help facilitate and expedite application processing for solar, wind, transmission, and other renewable energy projects. One immediate concern is that the BLM relies on the recovery of costs to support individual application processing; however, these funds are not available to support overall program costs or proactive efforts not associated with a particular solar application, such as environmental reviews or the establishment of Renewable Energy Coordination Offices. As we proceed, we may encounter other needed legislative authorities.

*5. What is the Department's expedited timeline for processing solar applications and have interim milestones been developed? Has the Department examined the deadlines associated with the Treasury's Grant program eligibility in forming timelines for processing applications? Is there sufficient time to conduct the proper environmental reviews in light of external deadlines?*

As mentioned above, the Department has identified several projects that have the potential to reach a decision stage by December 2010—the deadline associated with the Department of the Treasury's grant program and the Department of Energy's loan guarantee program. The Department expects to review these projects and comply with its responsibilities under NEPA and other laws in order to reach a permitting decision prior to this deadline. Beyond this interim milestone, the BLM is working concurrently to complete the Solar PEIS and to process and assess individual solar energy development applications. Completion of the Solar PEIS in the summer of 2011 represents the key milestone for establishing a comprehensive, national, solar energy development program.

Please contact me or have your staff contact Mr. Steve Black of my staff at 202-208-4132 if you would like to have further discussions regarding the Department's solar energy development initiatives.

Sincerely,



Ken Salazar

EARL BLUMENAUER, OREGON  
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 JOHN B. LARSON, CONNECTICUT  
 STEPHANIE HERBETH SANDOLIN, SOUTH DAKOTA  
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ONE HUNDRED ELEVENTH CONGRESS  
**Select Committee on**  
**Energy Independence and Global Warming**  
**U.S. House of Representatives**  
**Washington, DC 20515**

EDWARD J. MARKEY, MASSACHUSETTS  
 CHAIRMAN

July 16, 2009

The Honorable Steven Chu  
 Secretary  
 Department of Energy  
 1000 Independence Ave., SW  
 Washington, DC 20585

Dear Secretary Chu:

As part of the Select Committee's ongoing review of policies to promote renewable energy, I write to request information on the Department of Energy's loan guarantee programs.

As you know, I am a strong proponent of the widespread development of renewable energy resources. The House recently passed Chairman Waxman's and my bill, the American Clean Energy and Security Act, which included a 20% combined renewable energy and energy efficiency standard. Widespread deployment of renewable resources will create clean energy jobs, reduce our dependence on foreign oil, and reduce the amount of global warming emissions threatening our planet. In particular, solar electricity has significant potential to help meet our nation's electricity needs and has enjoyed sizeable cost reductions in the last few years.

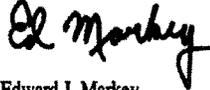
Financing of alternative energy projects continues to be a challenge in developing renewable resources and DOE's loan guarantee program remains a critical component for many renewable developers. As I am sure you are aware, many of the large solar energy projects under development in the West are pursuing debt financing through the DOE's Loan Guarantee Program, which expires on September 30, 2011, and the U.S. Treasury's Grant-in-Lieu Program, which requires projects to start construction by December 31, 2010. A number of solar developers have indicated that it is of critical importance for DOE's loan guarantee process to stay on schedule so that the solar projects can maintain their planned development, permitting and construction schedules -- both to be eligible to receive grants and to get power delivered to customers. I appreciate the diligent efforts that DOE has undertaken in assuring that the grant program works effectively and efficiently to help accomplish our nation's renewable electricity goals.

The Select Committee is interested in obtaining more information on the process by which solar energy projects obtain DOE's loan guarantees under Title XVII of the 2005 Energy Act. To help the Committee in this endeavor, please address the following questions.

1. Does the DOE provide feedback to applicants in stages such as initial feedback on application status (with, for example, preliminary non-binding term sheets)? What is the process for ultimately negotiating loan documents as quickly as possible? Are applicants given key milestones to work toward so that they can evaluate their options at each stage?
2. How long would a typical applicant have to wait to both secure a loan guarantee and to complete the NEPA review required for a DOE loan guarantee? Does this process allow for solar projects to secure both the loan guarantees and the U.S. Treasury's grants?
3. How many total expected disbursements of grants in lieu of investment tax credits could be made to projects commencing construction by the statutorily required date based on the current processes at DOE and the U.S. Treasury? What would your estimate be of the total expected disbursements of grants in lieu of investment tax credits if the date to commence construction were extended for one additional year?
4. Are there other obstacles to the loan guarantee programs due to conflicting policies or requirements set by different agencies or programs that need to be resolved?

Thank you for your assistance and cooperation in responding to this request. Should you have any questions, please contact Morgan Gray or Partha Malvadkar of the Select Committee staff at 202-225-4012.

Sincerely,



Edward J. Markey  
Chair



**Department of Energy**  
Washington, DC 20585

SEP 01 2009

The Honorable Edward Markey  
Chairman of the Select Committee on Energy  
Independence and Global Warming  
U.S. House of Representatives  
Washington, D.C. 20515

Dear Chairman Markey:

Thank you for your July 16, 2009, letter to Secretary Chu regarding the Department of Energy's Loan Guarantee Program (LGP). In your letter you requested information on the process by which solar energy projects obtain DOE's loan guarantees under Title XVII of the Energy Policy Act of 2005 (EPA) and asked the Department to address four specific questions. Your letter has been referred to me for reply.

The Department's responses to the four specific questions are provided as follows:

- 1. Does the DOE provide feedback to applicants in stages such as initial feedback on application status (with, for example, preliminary non-binding term sheets)? What is the process for ultimately negotiating loan documents as quickly as possible? Are applicants given key milestones to work toward so they can evaluate their options at each stage?**

The Department's LGP application review process is an iterative process that provides a progression of feedback to applicants. In general, after a complete application has been received by the Department, and been given an initial financial and technical review, if appropriate, based on the initial review, the project sponsors are invited to negotiate with the Department. For those applications selected for negotiation, DOE commences an underwriting and due diligence process which includes a comprehensive legal, technical, financial, market and environmental analysis of the project and creation of a term sheet of material terms and conditions for a loan guarantee. Once negotiations begin, applicants are in constant communication with DOE Senior Investment Officers who are committed to establishing key milestones and assisting the applicant towards a loan guarantee while maintaining the integrity of the program and protecting the American taxpayer. Once the due diligence process is complete and the project and a proposed term sheet are approved within DOE, the Department issues an executed conditional commitment with the approved term sheet attached. The term sheet is used by the DOE and the borrower as the basis for all formal project agreements including the loan guarantee agreement. The project agreements may be executed once they are complete and the applicant has met all the requirements of the term sheet, the statute, and applicable rules. Per



Title XVII of the EPAct, formal approval of the loan guarantee only occurs when the Secretary of Energy (or his delegate) executes the full loan guarantee agreement and credit subsidy has been paid.

**2. How long would a typical applicant have to wait to both secure a loan guarantee and to complete the NEPA review required for a DOE loan guarantee? Does this process allow for solar projects to secure both the loan guarantees and the U.S. Treasury's grants?**

The estimated time for completion of the application process is 6-to-28 months, depending on the type and duration of the project, financing, and overall complexity.

As a federal action, all DOE loan guarantees are subject to the National Environmental Policy Act (NEPA). There are three types of review under NEPA: categorical exclusions (CX), environmental assessments (EA), and environmental impact statements (EIS). The average timeline for an environmental assessment is generally 4-8 months, and for an environmental impact statement around 18-24 months. Since the EIS process involves significant environmental impacts it requires a far more rigorous and expanded review and public involvement process than for an EA. This includes the solicitation of public review and comment on the draft EIS, and holding related public meetings and hearings. Upon commencement of due diligence and negotiations, the NEPA division of the LGP will work with the applicant and contractor in an iterative process to ensure smooth and timely completion of the NEPA process.

In reviewing completed applications, and in prioritizing and selecting those to whom a term sheet should be offered, DOE will apply the criteria set forth in the EPAct, the applicable solicitation, and Section 609.7 of the LGP's Final Rule governing Section 1703 of Title XVII of the EPAct. Applications will be considered in a competitive process (i.e. each application will be evaluated against other applications responsive to the solicitation). Greater weight will be given to applications that rely upon a smaller guarantee percentage, all else being equal. Concurrent with its review process, DOE will consult with the Secretary of the Treasury regarding the terms and conditions of the potential loan guarantee. Specifically, the Department will take into consideration whether and to what extent the applicant will rely upon other Federal and non-Federal governmental assistance such as grants, tax credits, or other loan guarantees to support the financing, construction, and operation of the project and how such assistance will impact the project.

Solar property is eligible for a payment in lieu of a tax credit only if (1) it is placed in service in 2009 or 2010, or (2) construction of the property begins in 2009 or 2010 and the property is placed in service before 2017.

3. **How many total expected disbursements of grants in lieu of investment tax credits could be made to projects commencing construction by the statutorily required date based on the current processes at DOE and the U.S. Treasury? What would your estimate be of the total expected disbursements of grants in lieu of investment tax credits if the date to commence construction were extended for one additional year?**

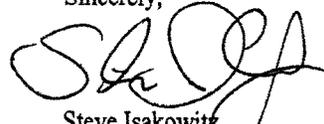
DOE supported Treasury's development of the grant in-lieu of tax credit. The Departments collaborated to develop the application, terms and conditions form, and guidance document which are now being used by applicants. The National Renewable Energy Laboratory created a web-based application process and is conducting technical and cost evaluations to advise Treasury. DOE is advised that, since initiation of the program, applications are being evaluated to assure compliance with the Congressional 60 day completion guidance. Treasury reviewed past tax credit history to predict the scale of new applications. Based on the rate of economic recovery some developers may find the tax credits more attractive than cash grants in the future. The current trend is for most renewable organizations to prefer the cash grants. Current estimates from Treasury are that 5,000 projects will receive grants from Treasury totaling \$3 billion. The program has been a full success and may attract more applications than this estimate. In the three weeks following the initiation of the grant process on July 31, 2009, more than 120 applications were received with nearly \$800 million requested in grants. If this approach were extended for an additional year it would be reasonable to expect between a 50 and 70 percent increase in these estimates since the industry has enthusiastically embraced this new opportunity.

4. **Are there any other obstacles to the loan guarantee programs due to the conflicting policies or requirements set by different agencies or programs that need to be resolved?**

The Department is currently seeking public comment on proposed amendments to its regulations implementing the LGP authorized by Section 1703 of Title XVII of the EPCA. This proposal would allow for a more flexible approach to determining appropriate structures, collateral security and other credit support for loan guarantees, consistent with the requirements of Title XVII. The proposal would also facilitate collateral sharing arrangements among DOE and other project lenders.

If you have any further questions, please do not hesitate to contact Ms. Kathy Peery, in the Office of Congressional and Intergovernmental Affairs, at (202) 586-2794.

Sincerely,



Steve Isakowitz  
Chief Financial Officer

The CHAIRMAN. And I also ask for unanimous consent to have a report from the U.S. National Renewable Energy Laboratory responding to the Spanish jobs report study also be included in the record at the appropriate point. Without objection, that also is so ordered.

[The information follows:]



National Renewable Energy Laboratory

A national laboratory of the U.S. Department of Energy  
Office of Energy Efficiency & Renewable Energy

Innovation for Our Energy Future

**NREL Response to the Report  
*Study of the Effects on  
Employment of Public Aid to  
Renewable Energy Sources from  
King Juan Carlos University  
(Spain)***

Eric Lantz and Suzanne Tegen

**White Paper**  
NREL/TP-6A2-46261  
August 2009

NREL is operated for DOE by the Alliance for Sustainable Energy, LLC. Contract No. DE-AC36-05-GO28309



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NREL/TP-6A2-46261  
August 2009

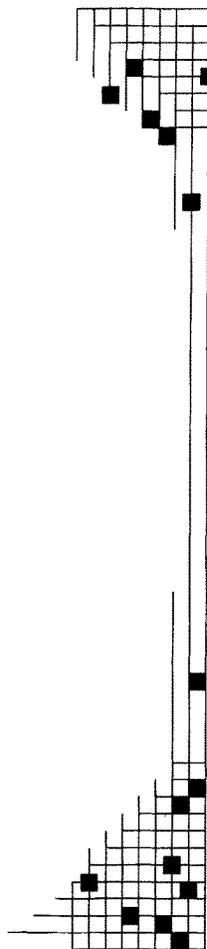
Eric Lantz and Suzanne Tegen

Prepared under Task No. SAO9.2011

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## Background

Job generation has been a part of the national dialogue surrounding energy policy and renewable energy (RE) for many years. RE advocates tout the ability of renewable energy to support new job opportunities in rural locations and the manufacturing sector. Others argue that spending on renewable energy is an inefficient allocation of resources and can result in job losses in the broader economy.

The report *Study of the Effects on Employment of Public Aid to Renewable Energy Sources*, from King Juan Carlos University in Spain, is one recent addition to this debate. The report asserts that, on average, every renewable energy job in Spain “destroyed” 2.2 jobs in the broader Spanish economy. The authors also apply this ratio in the U.S. context to estimate expected job loss from renewable energy development and policy in the United States (Alvarez et al. 2009).

The analysis by the authors from King Juan Carlos University represents a significant divergence from traditional methodologies used to estimate employment impacts from renewable energy. In fact, the methodology does not reflect an employment impact analysis. Accordingly, the primary conclusion made by the authors – policy support of renewable energy results in net jobs losses – is not supported by their work.

This white paper discusses fundamental and technical limitations of the analysis conducted by King Juan Carlos University and notes critical shortcomings in assumptions implicit in the conclusions. The white paper also includes a review of traditional employment impact analyses that rely on accepted, peer-reviewed methodologies, and it highlights specific variables that can significantly influence the results of employment impact analysis.

## Summary of King Juan Carlos University Methodology

The authors of the King Juan Carlos study intend to relate the economic efficiency of renewable energy jobs to those of the broader economy. To do this, they compare the government expenditure per estimated RE job with the average private-sector resources expended per worker and the average productivity per worker. Their quantitative approach is shown below.

$$\text{Calculation A: } \frac{\textit{Subsidy to renewables per worker}}{\textit{Average capital per worker}}$$

$$\text{Calculation B: } \frac{\textit{Annual subsidy to renewables per worker}}{\textit{Average productivity per worker}}$$

The Spanish report asserts that the results derived from the ratios above represent job loss as a result of public investment in renewable energy. This is based on the assumed principle that every dollar spent subsidizing renewables represents a reduction of one dollar in private-sector investment *and* that every dollar spent in the private sector will generate jobs equally.

In contrast, traditional jobs analyses evaluate how changes in demand for specific goods and services will affect economic activity and jobs within specific industries, their supply chain, and the broader economy. The input-output tables applied in traditional analyses are derived from real inter-industry transactions at a specific time. The most sophisticated analyses account for a reduction in demand where

substitutions occur (e.g., reduced demand for conventional electricity generation due to new renewable generation), as well as the effects of government expenditures and changes in commodity prices (e.g., electricity).

### Fundamental Limitations

- **The metrics used in the Spanish study are not jobs impact estimates.** The primary conclusion of the report is that the Spanish economy has experienced job loss as a result of its RE installations. However, comparing the RE subsidy per job with the Spanish economy's average capital per job and average productivity per job is not a measure of job loss. Traditional methods for estimating jobs and economic impacts are discussed below.
- **The comparison of RE jobs with average economy-wide metrics fails to recognize the variability within the modern economy.** The cost of job creation varies significantly among economic sectors. For example, creating employment for legal or medical professionals costs more than creating employment for clerical or administrative professionals. Applying a methodology that compares renewable energy employment with an economy-wide average explains very little about how RE job creation compares with comparable industries. A more informative analysis would compare metrics relating to RE workers with metrics for workers in other electricity generating industries. It would also show the range of metrics that exist across industries rather than economy-wide averages.<sup>1</sup>
- **The report fails to account for technology export potential.** Robust RE technology exports can greatly affect economic impacts of renewable energy (Lehr et. al. 2008). With its proactive RE policies, Spain is already a major exporter of renewable energy equipment (David 2009).<sup>2</sup> If global demand for RE technology increases, Spain's early investment could allow it to capitalize on a global market for RE technology, which would contribute further to the Spanish economy.
- **The study ignores the role of government in facilitating growth of valued new industries.** Governments invest in renewable energy technologies to promote the growth of the industry as a whole. Emerging RE technologies have not achieved levels of maturity and economies of scale that traditional technologies have; nor have they benefited from years of public and private investment. As a result, there may be a role for government to play in leveling the playing field between new and old technologies and in supporting emerging technologies. In the United States, all conventional energy technologies received government support in their early stages, and still benefit from government investment today (EIA 2008).

### Technical Limitations

- **The calculation of average capital and average productivity per worker is based on jobs resulting from economic activity at all levels (i.e., it includes direct, indirect, and induced jobs).**

<sup>1</sup> These results could simply suggest that RE jobs require more highly trained – and, therefore, more costly – workers than the Spanish economy, in general. Moreover, the deviation from the economy-wide average capital and productivity per worker observed for renewables may be well within the statistical norms of a diverse and robust modern economy.

<sup>2</sup> Spain was the second-largest supplier of U.S. wind turbine generator imports in 2007 and 2008, and its overall exports of wind-powered generator sets reached \$469.7 million in 2008 (David 2009).

**However, the RE jobs estimate used to calculate the RE subsidy per job is based on a quantification of direct and indirect impacts only.** The RE employment data used in this analysis is based on analysis of the direct and indirect job impacts from investment in renewable energy (MITRE 2003). Yet the average capital per worker and average productivity per worker are based on employment estimates that include jobs resulting from direct, indirect, and induced economic activity. A more complete comparison would include induced jobs impacts in the total RE jobs estimate that is used to estimate the average RE subsidy per worker.<sup>3</sup>

- **The report relies on jobs estimates that were developed in 2003 and do not reflect Spain's RE industries in 2009.** The total RE job creation estimate used by the authors was derived from two hypothetical Spanish deployment scenarios conducted in 2003 (MITRE 2003). However, neither of these projections reflects the actual deployment of renewable energy capacity in Spain. The authors imply that these results are a valid approximation. This approach ignores the discrepancies between assumptions that were reasonable in 2003 and the empirical reality that exists today.
- **The report lacks transparency and supporting statistics.** It is striking that the authors' calculations with two very different economic metrics generate the same result. The authors claim this increases their confidence in their result. However, because there is no statistical analysis, it does not seem reasonable to draw conclusions regarding confidence in either result. The authors also fail to justify their chosen methodology or cite others who have applied a similar methodology.

### Shortcomings in Assumptions

- **The authors assume that a dollar spent by the government is less efficient than a dollar spent by private industry and that it crowds out private investment.** Government spending may be more or less efficient than private investment. To the extent that government spending is a correction for market failures (e.g., existing fossil fuel subsidies, environmental externalities), it is less likely to represent an inefficient allocation of resources. Furthermore, there is no justification given for the assumption that government spending (e.g., tax credits or subsidies) would force out private investment. This assumption is fundamental to the conclusion that Spain's renewable energy policy has resulted in job loss.<sup>4</sup>

Even if every public dollar spent on renewables does result in fewer jobs than the average dollar spent in the Spanish economy, public investment in renewables will only result in overall job loss when: there is full employment, all private-sector funds are spent on job-generating activity (i.e., not on shareholder dividends or paying down debt), and there is no positive benefit for the society from renewable energy in general. Without each of these conditions holding true, one cannot claim that public investment has resulted in job loss, regardless of the efficiency of the public investment.

- **The authors assume that results from Spain are reflective of the impact of RE technologies in other countries.** Countries have different regulations, policies, and incentives for renewable energy.

<sup>3</sup> Direct and indirect impacts include the impacts from expenditures in the industry of focus, as well as the various industries that supply the industry that is the subject of the analysis. Induced economic activity results from spending income generated through the original investments at the direct and indirect levels. A full social accounting matrix of economic activity includes all three levels of economic activity.

<sup>4</sup> Government spending may result in reallocation of resources.

Minor policy differences can have great impacts on outcomes. Applying a single result derived from a specific set of market and policy conditions to renewable energy, in general, is a distortion of real differences in global market and policy conditions. For example, Spanish feed-in tariff (FIT) policies require utilities to purchase all electricity generated by RE resources at a price that is often much greater than the wholesale prices paid to conventional generators. This policy differs greatly from U.S. incentives such as the production tax credit (PTC).

- **The report relies on jobs as the sole metric to assess the value of renewable energy.** The number of jobs resulting from an impact analysis is an important metric. However, it is not the only value of interest. An analysis of relative costs per job within a specific industry or economy fails to account for the array of costs and benefits that are associated with any investment alternative. For example, Spain relies on natural gas and coal for roughly 52% of its electricity production (IEA 2006). Decreasing that dependence has a number of important energy and economic security implications (NREL et. al. 2008).

In summary, the analysis performed in this recent study is not a jobs impact estimate and, therefore, provides little insight into job creation or job loss from Spanish RE policy. Additionally, this analysis has oversimplifications and assumptions that lead to questions regarding its quantitative results. Finally, the authors fail to justify their implication that because of the jobs comparison, subsidies for renewables are not worthwhile. This ignores an array of benefits besides employment creation that flow from government investment in renewable energy technologies.

Nevertheless, the authors' basic question regarding whether investment in RE provides a positive or negative employment impact is a fair one. The following portion of this white paper briefly reviews additional literature that considers this question.

### **Traditional Employment Impacts Analysis**

Traditional methods applied in jobs and economic impacts analyses rely on input-output models to estimate job creation or loss. These models measure how changes in demand for specific goods and services affect economic activity and jobs within the specific area of study. At the most basic level, jobs analyses rely on a straightforward estimate of gross economic impacts from new investments in specific energy technologies under different scenarios. Such efforts in the United States suggest that, in some cases, the project-level job creation impacts of wind power are greater than that of conventional energy generation resources, including coal and natural gas (Tegen 2006, Lantz and Tegen 2008).

More sophisticated models allow for estimates of net jobs impacts. These models account for a reduction in demand for conventional generation, the effects of government expenditures on RE in the economy, and electricity price impacts.<sup>5</sup> The results of analyses applying these more sophisticated models are mixed; however, with today's cost projections, RE technology jobs and impacts generally have been shown to be greater than business-as-usual scenarios. Some examples follow.

The Monitoring and Modeling Initiative on the Targets of Renewable Energy (MITRE) determined that across Europe, as well as in Spain, renewable energy development would have a net positive impact on

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<sup>5</sup> Such models typically use a combination of input-output and macroeconomic modeling capabilities.

employment (MITRE 2003).<sup>6</sup> Work focused on Germany, conducted in 2005, found that feed-in tariff (FIT) policies in their country would result in a surge in employment between 2004 and 2008 as deployment proceeded rapidly; but net employment would turn negative in 2010 as construction of new facilities declined and the higher costs of renewable energy impacted the broader economy (Hillebrand et al. 2006). More recent work finds that, in Germany, net employment remains positive for all renewables deployment scenarios across a variety of sensitivities, and growing export markets greatly increase the net employment impact (Lehr et al. 2008).<sup>7</sup> Finally, an April 2009 study conducted on behalf of the European Commission's Directorate-General Energy and Transport shows "[p]olicies that support renewable energy sources (RES) give a significant boost to the economy and the number of jobs in the EU. Improving current policies so that the target of 20% RES in final energy consumption in 2020 can be achieved will provide a net effect of about 410,000 additional jobs and 0.24% additional gross domestic product (GDP)" (Ragwitz et al. 2009).

In general, comprehensive analyses show that net employment impacts are sensitive to assumptions regarding future energy prices, strategies for addressing greenhouse gas (GHG) emissions reductions, and the capacity to export technology. With increased awareness of potential energy price scenarios, recent research has found that it is only when conventional energy prices are forecast to be very low that net employment impacts from RE investments are negative.<sup>8</sup>

## Conclusions

The recent report from King Juan Carlos University deviates from the traditional research methodologies used to estimate jobs impacts. In addition, it lacks transparency and supporting statistics, and fails to compare RE technologies with comparable energy industry metrics. It also fails to account for important issues such as the role of government in emerging markets, the success of RE exports in Spain, and the fact that induced economic impacts can be attributed to RE deployment. Finally, differences in policy are significant enough that the results of analysis conducted in the Spanish context are not likely to be indicative of workforce impacts in the United States or other countries.

Energy policy has always been a politically charged subject. And in today's economy, where job creation is at a premium, questions pertaining to the impact of energy policy on employment magnify the sensitive nature of this debate. Measuring long-term economic and employment impacts is a complex task, sensitive to an array of unknowns, including future prices for both conventional fuel and renewable energy. Because this work is highly sensitive to assumptions and the quality of research, it is critical that policy makers seriously evaluate the work presented to them; and even after careful scrutiny, place jobs estimates within the broader context of energy, the economy, the environment, and the future.

<sup>6</sup> Remarkably, this is the same resource that the King Juan Carlos University authors use to argue that the Spanish economy is losing jobs as a result of its policies promoting renewable energy.

<sup>7</sup> Even with conservative assumptions relative to today's prices – where renewable energy is not expected to be wholly cost-competitive until 2020 (at oil prices of \$60 per barrel in 2020 and CO<sub>2</sub> at €15 per ton) – there is a net positive impact that is further boosted by technology exports. It is only in the most extreme scenarios with very low energy prices (\$30 per barrel oil in 2020) and no exports of RE equipment, that the net employment impact of Germany's feed-in tariff policies is negative (Lehr et al. 2008).

<sup>8</sup> In most recent analysis, electricity-price increases from renewable energy deployment are minimal. The U.S. Energy Information Administration's analysis of two scenarios with a national 25% renewable energy standard (RES) showed that national electricity prices are impacted by less than 1% by 2030 (EIA 2009). A similar NREL report showed that of the RES proposals analyzed, no state experiences electricity price increases of more than 5%, and most states actually experience electricity price decreases rather than increases (Sullivan et al. 2009).

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1. REPORT DATE (DD-MM-YYYY) August 2009	2. REPORT TYPE White Paper	3. DATES COVERED (From - To)		
4. TITLE AND SUBTITLE NREL Response to the Report <i>Study of the Effects on Employment of Public Aid to Renewable Energy Sources</i> from King Juan Carlos University (Spain)		5a. CONTRACT NUMBER DE-AC36-08-GO28308		
		5b. GRANT NUMBER		
		5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) E. Lantz and S. Tegen		5d. PROJECT NUMBER NREL/TP-6A2-46261		
		5e. TASK NUMBER SAO9.2011		
		5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) National Renewable Energy Laboratory 1617 Cole Blvd. Golden, CO 80401-3393		8. PERFORMING ORGANIZATION REPORT NUMBER NREL/TP-6A2-46261		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S) NREL		
		11. SPONSORING/MONITORING AGENCY REPORT NUMBER		
12. DISTRIBUTION AVAILABILITY STATEMENT National Technical Information Service U.S. Department of Commerce 5285 Port Royal Road Springfield, VA 22161				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT (Maximum 200 Words) Job generation has been a part of the national dialogue surrounding energy policy and renewable energy (RE) for many years. RE advocates tout the ability of renewable energy to support new job opportunities in rural locations and the manufacturing sector. Others argue that spending on renewable energy is an inefficient allocation of resources and can result in job losses in the broader economy. The report <i>Study of the Effects on Employment of Public Aid to Renewable Energy Sources</i> , from King Juan Carlos University in Spain, is one recent addition to this debate. The report asserts that, on average, every renewable energy job in Spain "destroyed" 2.2 jobs in the broader Spanish economy. The authors also apply this ratio in the U.S. context to estimate expected job loss from renewable energy development and policy in the United States. This white paper discusses fundamental and technical limitations of the analysis conducted by King Juan Carlos University and notes critical shortcomings in assumptions implicit in the conclusions. The white paper also includes a review of traditional employment impact analyses that rely on accepted, peer-reviewed methodologies, and it highlights specific variables that can significantly influence the results of employment impact analysis.				
15. SUBJECT TERMS NREL; renewable energy; job generation; RE; King Juan Carlos University of Spain; U.S. jobs; employment; analysis; job impacts; job development; energy sources; manufacturing; Eric Lantz; Suzanne Tegen				
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The CHAIRMAN. Let me turn to you, Dr. Burns, if I may. Could you explain the relationship between Dow Corning and the fiber optic revolution of the 1980s?

Ms. BURNS. That would be Corning, Incorporated, and actually using our materials in fiber optics. But Corning is a shareholder of our company.

The CHAIRMAN. But they used your technology.

Ms. BURNS. They used our technology.

The CHAIRMAN. Your fiber optic technology.

Ms. BURNS. Our advanced materials that they converted into fiber optics.

The CHAIRMAN. That is a very interesting story, is it not, that up until 1983, the only way in which we transmitted information—AT&T, of course, was the only meaningful telecommunications company in the United States—was over copper wires. And then we broke up AT&T as a Nation, and the first call that went from MCI went to Corning to use your materials that Corning of New York was putting into these new fiber optic technologies, using light as a means of transmitting information. And that is where the fiber optic revolution began, using your materials.

Ms. BURNS. Yes.

The CHAIRMAN. And it seems kind of funny that you look back and you say, well, Alexander Graham Bell, who invented the phone 100 years before, by the way, using lights, but he couldn't figure out a way of dealing with weather and other circumstances. So he was kind of waiting for the kind of materials that you were developing so that it could be transmitted in a way that wouldn't be subject to weather and other sources. So all of a sudden, Alexander Graham Bell up until 1983 is actually still able to recognize the phone system because it was the way he invented it. It is the way a phone call had been moving all those years.

And in a lot of ways, that is really what we are talking about over here with the smart grid. The smart grid makes it possible for us to use the telecommunications revolution to bring in the sun and the wind from the deserts and the prairies, off of the ocean, off of people's rooftops, and to begin to integrate it more into the totality of the grid that we have in our country. It makes it a lot more affordable. Of course, it took the Dow Corning revolution in fiber optics in order to make all of that possible so ultimately we could move to a broadband technology, but now we have this next revolution, and people are arching an eyebrow and saying, well, could we have the same kind of revolution here in energy that we had in the telecom sector?

So my question to you is this: You have heard the conversation, Dr. Burns, about solar, and you talked about a thin-film solar technology, which Dow Corning has. Could you expand a little bit upon that and what your hopes are for thin-film solar, and especially in terms of its price point as each year goes by, and maybe using 2020 as kind of an outside year in terms of what you believe the price of solar-generated electricity can be using thin-film solar?

Ms. BURNS. Well, first of all, I think there is going to be a lot of different solutions to this renewable challenge, from wind to photovoltaics. And I think there is going to be a place for thin-film in that equation as well as the more rigid modules, depending on

the needs and the building design, if you are putting it on a building.

The CHAIRMAN. So the reason we are having this hearing is just solar. Can we try to put—bring in the sunshine and put it on the solar issue? Wind gets a lot of attention, and hybrid vehicles and batteries.

Ms. BURNS. Solar cells have come a long ways from the one that is hanging behind your chair. We are marching on a path where we are going to reach grid parity with these technologies.

The CHAIRMAN. When do you think that will happen?

Ms. BURNS. There is a lot of variables in that whole equation, and I believe we are going to find it in the next 2 to 5 years.

The CHAIRMAN. Two to five years?

Ms. BURNS. Yes. It depends on where you are located and how much sunshine you get, et cetera, et cetera. But these solutions are moving more and more efficiently and—

The CHAIRMAN. Now, when you say grid parity, are you talking about equating the cost of generating electricity from solar with generating electricity from coal?

Ms. BURNS. Yes, from traditional sources, from coal, natural gas, hydro.

The CHAIRMAN. So 2 to 5 years did you say?

Ms. BURNS. In some countries, as you know, like Japan, they are at grid parity now, and certainly at grid parity during peak use hours.

The CHAIRMAN. Yeah. So that is a big news story. People don't talk in those terms. People still think of solar as some distant dream that might be achieved in the next generation, not something that is basically right over the hill and could be in place within 5 years competing effectively with coal.

So where do you think that would be possible? That is, in what percentage, for example, of American consumers do you think could benefit from those kind of breakthroughs?

Ms. BURNS. These guys probably have a better answer than I do because I am so far up in the value chain. But my view is that where solar right now is less than 1 percent of our energy contribution, that should be up in the 5 to 7 percent over time. And I don't know how much time that is going to take, but that is a huge expansion in solar power as a source of electricity.

The CHAIRMAN. We had Dr. Emanuel Sachs testify in July before our committee, and he is the founder of the company Evergreen, and now he has founded a new company called 1366 Technologies. He testified that he believed that 7 percent of all electricity in the world could be generated from photovoltaics by the year 2020. Do you think that is just some Panglossian number that is pulled out of the sky, or do you think there might be some basis in that?

Ms. BURNS. I think if we are smart about it, we could achieve that.

The CHAIRMAN. That is just amazing, because again, people focus so much, as Mr. Inslee said, on wind. And even in our deliberations on the bill, we spent so much time on biomass and other issues. But this solar issue really has a capacity with the proper funding and public policy?

Ms. BURNS. Exactly. The right investment in research, policies to grow the market, and policies to encourage manufacturing investments.

The CHAIRMAN. And do you believe that your technology at Dow Corning is at the cutting edge in terms of thin-film solar?

Ms. BURNS. I think our specialized silicon-based materials are at the cutting edge. There are other companies that design the cells, design the modules, design the thin films, who—you know, there is a whole array of companies.

The CHAIRMAN. So you are—you provide the materials. You are like the arms merchant. All these solar companies will come to you, and they are going to have their—

Ms. BURNS. We hope they do.

The CHAIRMAN. Are they coming to you?

Ms. BURNS. Yes, absolutely. And they are coming to us to get advice on investing in the U.S., to make their—whether it is their cells or their modules.

The CHAIRMAN. And how many companies have come to you?

Ms. BURNS. I would say more than five.

The CHAIRMAN. More than five.

Ms. BURNS. Five major players.

The CHAIRMAN. Major players. How do you define a major player?

Ms. BURNS. Either as a cutting-edge innovator or a leader in their segment.

The CHAIRMAN. Okay. And amongst the—are they well-funded companies?

Ms. BURNS. Uh-huh.

The CHAIRMAN. Yeah. And are they buying into this idea that there is a 2- to 5-year horizon on thin-film solar?

Ms. BURNS. They are making some tremendous investments, and that is always based on your business evaluation of your potential.

The CHAIRMAN. So this is private-sector venture capital money being put up to place money on this bet?

Ms. BURNS. Or large public companies who are choosing to invest as part of their portfolio. We do have some smaller companies coming and working with us, and to echo some of the issues that were raised here, they do have an issue with access to capital and ability to get the loans that they need to make their investments.

The CHAIRMAN. So as you use 2 to 5 years as the horizon to establish parity between photovoltaics and coal as a source of generating electricity, even if you are wrong, do you think 10 years from now there is a chance that you would be wrong?

Ms. BURNS. No.

The CHAIRMAN. By 10 years it is a done deal?

Ms. BURNS. I think so. I think so.

The CHAIRMAN. Yeah. Do you agree with that, Mr. Kline?

Mr. KLINE. I think that it is very possible. I think one of the challenges will be—it will be somewhat dependent on two things: One, on the extent to which we use wise land planning and are able to actually take advantage of areas where there is great solar; and secondly, on building the transmission—

The CHAIRMAN. I guess we are talking about two different technologies. You are talking about thin-film solar, which isn't as dependent upon the Bureau of Land Management.

Ms. BURNS. I am talking about the absolute efficiency of the technology.

The CHAIRMAN. Of solar in general?

Ms. BURNS. Yes, exactly. These are even bigger and more important issues in terms of how—where do you put it, how do you transmit it and how do you consume it?

The CHAIRMAN. So you are saying—just so we can divide the question, you are saying the technology is going to be there, the breakthroughs that are just happening so quickly, the improvement and the efficiency, the lowering of the cost? And then the question becomes, where are we going to put it? How quickly can we do it, and how do we raise the capital in order to ensure that we do it in a way that we capture the benefits here in the United States?

So—then we come back—let me go to Ms. Culver, if I may, for a second. We will go over here to our Bureau of Land Management expert. Let me ask this: What is the land requirement for a large solar project, Ms. Culver?

Ms. CULVER. That might be something better for our friends from NextLight to—

The CHAIRMAN. I will come back to you with a related question.

Ms. CULVER. It is significant.

The CHAIRMAN. Give us an idea in terms of square miles.

Mr. DE ROSA. Sure. So our Antelope Valley, California, project with which we have a power purchase agreement with Pacific Gas & Electric, it is 230 megawatts, and it will cover about 2,100 acres.

The CHAIRMAN. Twenty-one hundred acres.

Ms. CULVER. Yes.

The CHAIRMAN. So let me come back to you, Ms. Culver, if I could. How much acreage does the Bureau of Land Management have under its control; do you know?

Ms. CULVER. Well, that I do know. Over 260 million. About 260—

The CHAIRMAN. Two hundred sixty million acres?

Ms. CULVER. Yes.

The CHAIRMAN. Do you know how much of that acreage it leases out to the oil and gas industry for its—

Ms. CULVER. I believe at last count we were well over 40 million.

The CHAIRMAN. So 40 million acres of public land under the control of the Bureau of Land Management is now leased to the oil and gas industry, 40 million?

Ms. CULVER. Yes, over 40—

The CHAIRMAN. Mr. De Rosa, what are you looking for?

Mr. DE ROSA. Twenty-one hundred acres, the size of a farm.

The CHAIRMAN. Twenty-one hundred acres. Okay. Wow. So that is quite a difference in terms of the use of public lands in the United States, and you will be able to generate how much electricity?

Mr. DE ROSA. Two hundred thirty megawatts. It is a midsized power plant. It is a good-sized power plant.

The CHAIRMAN. So out in California, Diablo Canyon is probably a 1,000-megawatt nuclear power plant?

Mr. KLINE. Twenty-two hundred.

The CHAIRMAN. Twenty-two hundred. It ruins my train of thought here. San Onofre is 1,000 megawatts?

Mr. DE ROSA. I think that is right.

The CHAIRMAN. Thank you, Mr. De Rosa. That is the correct answer, 1,000 megawatts.

So you are going to produce approximately a quarter of a nuclear power plant's generating capacity with your use of essentially a farm to install your solar technology?

Mr. DE ROSA. Yes, based on capacity.

The CHAIRMAN. Based upon capacity, yes. Thank you for that clarification, but yes.

So I am just trying to tell a story here so the people can have an idea of the ballpark we are in. It is Fenway Park, it is not Yellowstone Park. But just so people are in the conversation and they can understand the scale of what we are talking about.

Again, going back to Ms. Culver, 44 million acres for oil and gas industry, and over here we are looking for some policy that allows for wind and solar, but solar today, to also be put on public lands and to be giving them that opportunity.

Mr. Kline, why don't we come back to you and talk a little bit about the amount of space, acres, square miles that you think PG&E is going to need in order to generate the solar that you are going to need to meet your goals for renewable electricity in California.

Mr. KLINE. Mr. Chairman, I would have to go back and actually look at those numbers and add them up and give you a precise number. But I think if you used Mr. De Rosa's acreage as an example, and you multiply that by about 20, say—again, this is off the top of our collective heads, but—

The CHAIRMAN. Okay.

Mr. KLINE [continuing]. That would give you an idea.

The CHAIRMAN. But very knowledgeable heads. So in terms of megawattage, what are you talking about?

Mr. DE ROSA. Well, 20 would be about 4,500.

The CHAIRMAN. Forty-five hundred megawatts.

Mr. DE ROSA. And if you just scaled up the amount of acres, it would be 20 times 2—40,000 acres.

The CHAIRMAN. Forty thousand acres to match two Diablo Canyons or four San Onofres, nuclear power plants. So that is big news. That is incredible. And you are committed to doing that, your two companies?

Mr. KLINE. Yes.

Mr. DE ROSA. Yes.

The CHAIRMAN. You would not be going down this path if it was not economically viable?

Mr. KLINE. Well, with the caveat that in California we have an RPS.

The CHAIRMAN. That is a renewable electricity standard. A certain percentage of your electricity has to come from renewables, yeah.

Mr. KLINE. Yes. So we are driven to find the most cost-effective renewables, and that is where they are right now.

The CHAIRMAN. Solar is—

Mr. KLINE. Is where we are focusing a huge amount of our attention, yes.

The CHAIRMAN. Again, a lot of people think that wind is the future. But you have chosen solar.

Mr. KLINE. The issue for us is there is bountiful wind in California, but it tends to all blow at night, and frequently very late at night. And until we get a means of storing that energy and being able to use it when we need it—the beauty of solar for us is that it is right at the time we need it absolutely the most.

The CHAIRMAN. And again, that is why we put so much money into the stimulus package for battery technology and why we will continue to fund battery technology.

Again, the good news here is that if we could store the electricity generated from wind and solar, and then use it when we need it and have battery technology, massive battery technology, which makes that possible, then we have really got a good thing going, and the good news here is that we are not talking about putting a man on the moon and sending them up there.

By the way, that was 49 years ago President Kennedy was talking about that, can you believe that? And we put a man on the moon and brought him back 8 years after the President challenged our Nation to that. And by the way, they were up there all alone. It was tough up there. They were riding around—remember they were riding around in their vehicle up there, and whatever was powering that probably—some renewable energy was definitely powering that vehicle as they were bouncing around on the moon, and then they figured out how to get back in that thing without Houston ground control right next to them, and they came back.

So we are not actually challenging people to do that. We are just asking people to build a better battery. It seems like a more prosaic job; we just don't pay attention enough to it. And once we put our minds to it, it seems like we should be able to develop batteries that can store electricity.

Mr. Kline.

Mr. KLINE. I would just offer that it is even broader than batteries. I mean, there is a whole assortment of compressed air and other technologies that we and others are experimenting with. So I think the beauty is—again, we have technologies competing against each other. It may be batteries, or it may be compressed air.

The CHAIRMAN. Yeah. But again, once you say there is going to be a renewable electricity explosion in California and across the country, you give a huge incentive to private-sector companies to start investing in the storage technology, because those companies are going to become very, very wealthy, whoever can provide the storage capacity to all 50 States and to every utility in the country that is now going to be generating electricity.

So again, one revolution begets the next. So the telecom revolution creates the fiber optic broadband revolution that then makes the electricity Internet possible because all it is a broadband management of electricity. And then that revolution begets the smart

grid revolution, starts to beget the battery revolution and other revolutions, because you have to—now private sector companies can see the opportunity as to where they are going to make a fortune, maybe become the wealthiest people in the history of the world, whoever can develop the battery technology, competing, of course, with the people who become the thin-film solar leaders in the world. They might—everyone is going to be in a race here to pass Bill Gates as the wealthiest person in the world. It is whoever makes the breakthrough, patents it and starts selling it to everyone else. And you have to believe this in order to move in this direction.

But again, we are not talking about putting a man on the moon. We are talking about things that are relatively prosaic and incrementally—Dr. Burns referred to this drop, this kind of Moore's law in photovoltaic, how it drops 18 percent in cost with every doubling of production and improvements in efficiency, and it has occurred steadily since 1979. So this is not something that is fantastical. It is something that is happening in the real world and has reached a point where she is saying in 2 to 5 years it will match coal and match natural gas in terms of the cost if we can create the marketplace.

Mr. De Rosa.

Mr. DE ROSA. We at NextLight, we believe that, and we think that not only will there be cost reductions due to technology efficiency, but there will be cost reductions for the other half of the cost, which is the construction of these facilities. The construction of it, the balance of plant, is half of the cost, and those economies are just getting started.

I think the obstacle we face now is—and I agree with Dr. Burns, we are going to need all the applications. We are going to need the smaller rooftop applications. We are going to need the smaller, more urbanized solar applications, as well as the large power plants. Those large power plants have not been built yet. And so it is not a technology question. It is a financial—it is a financing question. We need to demonstrate to the people who are going to put up the money that they will get their—that they will get their money back.

The CHAIRMAN. What are the financial people concerned about right now?

Mr. DE ROSA. Lenders, equity investors are—they are cautious of investing in something that hasn't been done before.

The CHAIRMAN. So are they most concerned about—Dr. Burns talked about kind of the incredible advances made in the technology. You have as well. Is it the technology that they are uncertain about, or is it the BLM regulations, the ability to get access to the land, the guarantee that it is a predictable investment, tax policy? Could you go down the list of the things that you think are most important in terms of creating uncertainty in the minds of the private sector?

Mr. DE ROSA. Sure. So at NextLight we deal with proven technologies. We are not trying to advance that second or third generation. We want to get that first generation in first. And we need to deliver to investors a project with four corners around it that does not have environmental problems, that has its permits, that is a

good product for the utility, that has an interconnection, viable interconnection. So that is a given.

Then what the investor will look at is has it been done before on this scale, and that is the hurdle that we are at right now. It has been done in 1-megawatt blocks. It has been done in 5-megawatt blocks. But a 230-megawatt project—and it is not just our company. There are many companies out there developing utility scale, and we all think that is what we need to meet our goals.

Even though one could say, well, it is just 230 times the 1-megawatt project, but it—if you are the one putting up the money, there is a lot of questions that you ask. And you ask about supply chains, and you ask about construction process and all of those things. And so that is our challenge. It is to take this proven technology and convince the investors that it is proven, and it will—just by scaling up, there is nothing different about it. And that is where—if I could just—one more thing. That is where the DOE loan guarantee program comes in; that is where the ITC grant comes in as well.

The CHAIRMAN. And by the way, on that Cash for Clunkers temporary depletion of the renewables program, on the House floor, the Speaker and the Chairman of the Appropriations Committee did promise that the money would be completely restored. So that was all part of that very same-day debate that included the Cash for Clunkers in this room. So the commitment was made in the floor debate at that time. So I think you can pretty much take that to the bank.

So let me come back to you again, Ms. Culver. The Interior Department estimates that there are 2.9 million megawatts of solar potential in the Southwest on public land. We have in the whole country right now, we have 1 million megawatts of electricity that exist. That is the capacity. And we use about 450,000 megawatts of that on a daily basis.

It is about 1 million megawatts of capacity that is out there. And the Department of Interior has estimated again that there are 2.9 million megawatts of solar potential in the Southwest on public lands. So that would be almost three times the total electrical-generating capacity over the whole country today. It is a fantastic number. So the Department of Interior, including BLM lands, equals about 500 million acres.

So talk a little bit, Ms. Culver, about kind of the regulatory tensions that exist here between the preservation of the environment and the installation of these technologies that put us on a very fast path towards energy independence and solving the problem of global warming.

Ms. CULVER. Sure. I think there has been a lot made of the tension that has not quite come to bear. We have, of course, had a few conflicts over project siting, but the solar energy study areas that were recently identified and where the comments have been pouring into the Bureau of Land Management are looking at 670,000 acres that have been identified as close to existing transmission, not having a lot of environmental conflicts, and being very much suitable for solar energy development at the utilities scale in terms of both the potential it would generate and the terrain.

So I think at the first stage that the tension has—the tension is interesting for people to write about, but the tension in the actual

process itself has not been quite as high. And we are talking about 260 million acres, as we just talked about. Of that, the BLM's National Landscape Conservation System, which is basically the crown jewels of the wilderness, wilderness study areas, national monuments, conservation areas, it is about 26 million acres. So we are not talking about a giant portion of the public lands that are currently locked up from energy development.

The CHAIRMAN. Could you again give those numbers again, the denominator and the numerator?

Ms. CULVER. Of the 262 million acres of the Bureau of Land Management's lands, approximately 26 million, a little bit more has been added in the last omnibus, but of those are dedicated to the National Landscape Conservation System, which incorporates wilderness, wilderness study areas, national monuments, national conservation areas, wild and scenic rivers, and national and historic trails. So we do not have a situation where the vast majority of the lands are somehow locked up, and we are going to have to do drastic measures of things like fighting over wilderness study areas. It doesn't need to come to that. It shouldn't come to that.

The CHAIRMAN. Okay, great.

Let me come back to you, Mr. De Rosa. How much public land are you going to be using?

Mr. DE ROSA. We have a combination. Our projects—some of them are on public lands, and some are on private land. We have two active BLM projects right now roughly in the 2,000- to 4,000-acre range, about the same size as we mentioned before, 250 megawatts.

The CHAIRMAN. Are there any environmental issues surrounding those, the land under the management of the BLM, the projects that you are focused on?

Mr. DE ROSA. Those are going well. We have one in southern Nevada that was designated by the BLM and the Department of Interior as a fast-track project in southern Nevada, and we have one in Arizona that is in the second tier of the package of projects.

The CHAIRMAN. And is this all part of the 230 megawatts that you are talking about?

Mr. DE ROSA. No. These are separate projects.

The CHAIRMAN. Talk about the 230-megawatts project.

Mr. DE ROSA. That is in the Antelope Valley of California. It is on private land that we own. It is a former farm that is not being farmed anymore because there is not enough water, so it is fallow land. It is a great location, great site for solar, because as we would describe it, it is previously disturbed land; it has been cultivated before. So far we have unanimous community support and support from the environmental community as well.

The CHAIRMAN. So what are the obstacles then? You don't appear to have any land management issues, environmental issues. What are your issues that are remaining in terms of the construction of that project?

Mr. DE ROSA. It is financing.

The CHAIRMAN. Financing. And the financing is contingent upon? Again, if you can just say the words: "The confidence of the private sector." And they are waiting for what?

Mr. DE ROSA. They are looking for—they are looking for a demonstration that they will—they will get their money back; it will work, and they will get their money back.

The CHAIRMAN. What can demonstrate that to them?

Mr. DE ROSA. I think it is a combination of, as I said, a solid—a rock solid project with a creditworthy off-taker for 25 years and—

The CHAIRMAN. An off-taker is—can be differentiated from an undertaker? I have never heard of that before.

Mr. DE ROSA. Sorry for the trade lingo. It is the purchaser of the power, the electric utility who purchases the power.

The CHAIRMAN. Thank you.

And so what is your level of—what level of confidence, Mr. Kline, can PG&E give to Mr. De Rosa and his project and to the—are you the principal investor in this project?

Mr. KLINE. We are the purchaser of the power. We are the off-taker.

The CHAIRMAN. So are you partnered with the investors, or are you just standing on the sidelines waiting for the project to work, and then you will take it if they can get it done?

Mr. KLINE. It is the latter. And historically when the markets were working, projects like Mr. De Rosa's, when they had a signed contract from a creditworthy entity like PG&E, could take those to the bank and finance them. And the issue right now is they cannot.

The CHAIRMAN. They cannot. Well, and the reason they cannot, Mr. Kline?

Mr. KLINE. Because the credit markets are frozen, and that kind of lending project financing just isn't occurring.

The CHAIRMAN. I see. So in this state of the economy—it is kind of cryogenically frozen right now, and we are waiting for it to warm up. But let me just ask this: But you are basically saying—PG&E is saying to—your company's name again?

Mr. DE ROSA. NextLight.

The CHAIRMAN. NextLight—you are saying to NextLife—NextLight. NextLife gets back into undertaker. But NextLight—you are saying to NextLight, if you build it, Mr. NextLight, we are buying it from you?

Mr. KLINE. That is correct.

The CHAIRMAN. You are saying that to them?

Mr. KLINE. Yes.

The CHAIRMAN. Then you are saying, Mr. De Rosa, to the investment community, PG&E says if we build it, they are going to buy it, we have a letter promising us that. Huh? So this cryogenically frozen credit market is in pretty sad shape; if you can't rely upon this Rock of Gibraltar, which is PG&E, it is not going anywhere. It has a State law saying they have to buy renewable electricity. You are going to be able to produce it. And if you get it done, you have got a guaranteed market, and your investors are smiling all the way to the bank, right?

Mr. DE ROSA. It is our job to get it done, as you say.

The CHAIRMAN. So that introduces, then, the importance of the DOE loan guarantee program, huh?

Mr. DE ROSA. Yes. Absolutely.

The CHAIRMAN. So if you have got a loan guarantee program that you can also rely upon, then that gives more confidence to the private sector investors that they are not in this alone, huh?

Mr. DE ROSA. Absolutely, absolutely.

The CHAIRMAN. Yeah. So I actually—I am kind of heartened by this.

Ms. Burns is—Dr. Burns is—I am married to a doctor, so I apologize for that. Dr. Burns is telling us that the technology is there, it is moving along, she has got the materials, she is willing to sell to anyone, and she is guaranteeing improvements as the years go by. Ms. Culver is saying there is public land available, 90 percent of it, that would be usable for solar technology, and that it is out there and wouldn't have a lot of environmental or regulatory problems in using it. Mr. De Rosa is saying that he believes that utility-scale technology is the way to go, and that if you can have a marketplace—and California is building it here—with the mandate that the utilities have to come—we have to receive a high percentage of their electricity from renewables, that—and with the DOE loan guarantee program, that it might not be today, it might not be tomorrow, but it is happening pretty soon. It is a lot like Corning Dow back in 1983 with the fiber optic revolution. It is just now a question of when this inevitable revolution just breaks through, because we are going to continue to see the dramatic decline in the cost of producing this solar-generated electricity.

Mr. DE ROSA. For this and other projects, it will be 2010, it will be next year, that many—hopefully many projects will start construction.

The CHAIRMAN. Now, why do you point as 2010 as the date that you think kind of the dam breaks?

Mr. DE ROSA. 2010 is the—December of 2010 is the deadline for the Investment Tax Credit grant, and that is an important component in the financing because it makes the financing just that much more streamlined. It eliminates the need for this complicated tax equity investor in the projects.

The CHAIRMAN. So the combination of State renewable electricity standards and the existing—and the existence of an investment tax break is going to put a lot of pressure on investors to kind of close the deal to get the benefits?

Mr. DE ROSA. We are spending millions of dollars at risk developing these projects, and I think the investors and lenders would be eager to invest with that combination.

The CHAIRMAN. That is great.

You know what I am going to do? I am going to ask each one of you to give us your summary of 1 minute of what you want us to remember about this hearing and what the takeaway is from this incredibly optimistic view of the role that solar can play that I take from this hearing. We will go in reverse order and begin with you, Dr. Calzada.

Mr. CALZADA. I would say that when you look at the new investments, especially when there are technologies that are not ready now, you should have the feet in the air and look at past experience. And, of course, there is a place for new technology. This is wonderful. But there is an institutional place for those, this venture capital. This is the stock market. And I think that those tech-

nologies have to be improved there because forecast—they have many, many forecasts in the history. For example, I have here a forecast that President Carter was making in 1978 saying that by year 2000, 20 percent was going to be solar, and forecast—there are—forecasts when the private citizen does the forecast and makes a bet, nothing happened, because it is money. But when a politician does this, the problem might be that it puts people's money there. And I would say keep feet in the air and look at past experience not only in Spain, but in other countries, too, to see what has happened in reality.

The CHAIRMAN. Thank you, Dr. Calzada.

And since there is no one else here, I am going to alter what I was already putting in process here of getting the final statements just to say to you Dr. Calzada that, yes, Jimmy Carter did say that, and he was putting the policies in place to do that. He did not predict that he was going to lose to Ronald Reagan in 1980, however, and he did not predict that Ronald Reagan would name a dentist, James Edwards, as the Secretary of Energy in February of 1981, and that Doctor, quote—dentist—Dr. Edwards would then pledge to abolish the Department of Energy by May of 1981, which was his cause.

That was his goal, to abolish the Department of Energy, because he did not want any national planning for energy policies. And while there was a beautiful analogy there between Doctor—Dentist James Edward and the drilling that he had perfected in that profession and kind of the affinity that he had for an equivalent technology in oil and gas that also had drilling, it did exclude, unfortunately, wind and solar and geothermal and biomass from his vision.

And unfortunately, the Reagan administration lasted 8 years; also something Jimmy Carter did not predict. And unfortunately, the next Bush administration and the Republican control of the House and Senate for 12 years did not accommodate that technology either.

And so if you look backward, you can learn from history, but you have to understand that sometimes history does not repeat itself. And here it is not going to repeat itself. Okay? We are actually on day 1 at 8 a.m. of the Obama administration. It is going to last at least 4 years. The States now have, in the absence of Federal action, put their own renewable electricity standards on the books. And last year there was 9,000 new megawatts of wind and solar installed in the United States and 9,000 new megawatts of natural gas and only 1,500 new megawatts of coal. So the revolution is on. Okay? It is just how quickly now we are going to accelerate it, as Dr. Burns said. It is 2 to 5 years if we are optimistic and it continues to move at this pace. But in 10 years, it is a done deal.

So that is a different world. And while I love the Carter focus on these issues, that was 30 years ago, and we did miss a huge opportunity. We should have already completed the revolution now, but we were focusing too much on drilling and not enough on relatively prosaic technologies if they had been given the right kinds of incentives.

So I turn to you, Dr. Burns, for your final word.

Ms. BURNS. I believe we are in a new era of renewable energy, and solar is extremely promising. I encourage us to put in policies and regulatory practices that grow demand, because we are on the precipice of achieving energy efficiency and parity.

I think we should do more to attract manufacturing investments. I think it is a crime that most of the manufacturing is done offshore for our needs. And I can tell you green jobs are real. I look them in the face every day with the investments that we are putting in place.

The CHAIRMAN. And just to follow up here on Dr. Burns, China is already the leading exporter of solar technology. So it is no longer just Jimmy Carter talking about the United States. China is now industrialized. India is industrializing. Germany has targeted solar as one of their principal long-term manufacturing sectors. So we no longer have the luxury of just sitting on the sidelines here; otherwise we will end up importing it all anyway because we are going to have all these State and national requirements that we have renewable electricity, and the only question now is where is it going to be manufactured, here or overseas? Because these laws are not only not going to go away, they are going to get strengthened as the green generation of young people come along and demand that they be strengthened as every year goes by.

So that is the challenge for us. It is to make sure that Dow and other American companies are producing the jobs here.

Ms. Culver.

Ms. CULVER. Well, on the BLM lands, we do have under—44 million or so acres under lease for oil and gas, and we don't have large-scale solar projects. So what this really shows is we are starting from the ground up. It is an opportunity. There is a challenge. But there is an opportunity, and I really want to encourage us to learn the lessons that some of us have learned from the oil and gas program and to embrace this opportunity.

The program that is being built right now is a revolution of its own in management, and I think we need to support it and go forward with this approach of actually identifying and prioritizing and targeting the right lands for development and acknowledging that there are lands that are not appropriate for development right from the start.

What we have been seeing here is a very different approach where we have multiple opportunities for participation from the public and from the State and local experts. So we have people who know and people who care, and some of us actually both know and care, and we are getting a chance to improve the projects and to be able to support them. So I think if we continue down this path, we are going to be able to achieve some development.

The CHAIRMAN. And, Ms. Culver, do you know how many acres the BLM leases for coal development?

Ms. CULVER. I don't know that number off the top of my head.

The CHAIRMAN. That is a large number, huh?

Ms. CULVER. It is a large number.

The CHAIRMAN. Powder River Basin, et cetera, that is a lot of area. I bet you that area alone is enough to generate a lower—although it probably isn't as sunny as it could be in Powder River Basin.

Ms. CULVER. I think you could ask them to share their land. There is a lot of land that is under lease that is not being developed, and they could share it with our solar industry.

The CHAIRMAN. Sharing. Kind of a good "king to garden" concept. We could try to apply that here to solar and coal and oil and gas.

Mr. De Rosa.

Mr. DE ROSA. Thank you, Representative Markey.

The ingredients are in place for near-term, I think, dramatic acceleration of solar energy development, that the market demand is there. We have heard today the technologies are there today, with even more impressive technologies coming in the future. We have a determined Department of Interior and Bureau of Land Management to utilize Federal lands for renewable development, and we have a DOE loan guarantee program. We have an ITC grant. Let us keep those in place, and let us pass the green bank so that this isn't just a first wave, but it is a sustainable development of solar energy.

The CHAIRMAN. And the green bank that you are referring to is the provision in the Waxman-Markey bill which will leverage upwards of \$75 billion worth of investment in advanced technologies, not just solar and wind, but nuclear and other advanced technologies, but that green bank would be there as a permanent fund to be used in order to fund these new technologies.

Mr. Kline.

Mr. KLINE. Three things, Mr. Chairman. The first, mechanisms to create scale nationally. As Dr. Burns suggested, that is some form of a national RES. That is a very well, carefully constructed feed-in tariff. It is something that creates national scale beyond California and a few other States who are doing this. Continued financial support, as Mr. De Rosa described; and predictable transparent land use programs for Federal land that allow these projects to get constructed and the transmission related to them get constructed.

The CHAIRMAN. Thank you, Mr. Kline, very much. And we thank all of you. This was a 2-hour hearing to the minute, And it was very helpful. It will be on the record. And it is going to help us a lot over these next several months to ensure that we put the right permanent policies on the books to ensure that we complete this revolution.

Thank you all so, so much for your help.

[Whereupon, at 3:31 p.m., the committee was adjourned.]

**Questions for the Record**  
**Steven Kline**  
**Vice President, Corporate Environmental and Federal Affairs**  
**and Chief Sustainability Officer**  
**PG& E Corporation**

- 1) If not for federal and state mandates, would you incorporate renewable energy into your company's portfolio?

Yes, renewable energy has long been a part of PG&E's electric energy portfolio and, absent state requirements, PG&E would continue to incorporate renewable energy into its electric energy portfolio. While state laws requiring 20% renewables by 2010 and reductions in greenhouse gas emissions of about 30% by 2020 have been primary policy drivers of late, PG&E's customers are among the most environmentally conscious people in the country. Accordingly, even absent mandates, PG&E would be seeking to expand the amount of renewables in its portfolio to meet its customers' expectations.

- 2) Do you believe that your customers will end up paying more for their electric bills because of PG&E's inclusion of renewables in its portfolio?

Yes, we do. Over the next three to five years, PG&E expects that the procurement of additional renewable resources to meet the state's Renewable Portfolio Standard (RPS) requirement will increase the average customer rate about one to three percent relative to the market cost of power from conventional gas-fired resources. As the state moves toward a 33% RPS goal, the California Public Utilities Commission (CPUC) has indicated that the scale of new infrastructure investment to achieve that goal is approximately \$115 billion between now and 2020. Actual customer costs will vary depending on the procurement rules, resource mix, and need to construct new transmission lines.

- 3) What challenges involving federal lands has PG&E encountered in its attempts to expand the development of solar energy?

PG&E has had limited experience in developing thermal solar or PV solar projects in the Mojave Desert. In 2008, PG&E filed a Plan of Development for a right-of-way grant with the Bureau of Land Management (BLM) for a proposed 750 megawatt (MW) thermal solar plant in San Bernardino County, California. Prior to and during the feasibility analysis for this proposed project, PG&E evaluated several other BLM lands and private lands as alternative sites. Many of these sites were eliminated from further consideration due to the existence of protected natural areas or proposed protected areas. For over two years, PG&E has worked with the BLM and devoted considerable time and resources to the development of this proposed project in order to support meeting California's RPS. Recently PG&E completed an additional information request from the BLM on PG&E's application. The proposed project location is uncertain due

the proposed Mother Road Monument, which is shaped around the checkerboard pattern of Catellus Lands.

Since 2002, PG&E has signed more than 75 contracts with existing and new facilities that use or plan to use wind, geothermal, biogas, biomass, and solar as their fuel source. Solar energy is an especially attractive renewable power source because it is available when power is needed most in California – during the peak mid-day summer period. PG&E's portfolio includes both solar photovoltaic and solar thermal technologies. Since early 2008, PG&E has entered into fourteen solar contracts, five using solar PV technology and nine using solar thermal (or concentrated solar power) technologies. One of the PV facilities, Sempra's El Dorado facility in Boulder City, Colorado, has achieved commercial operation, while the other solar facilities are still being developed. In addition PG&E recently filed an application with the CPUC to develop, own and purchase moderate sized (1-20 megawatt) photovoltaic solar projects totaling 500 megawatts in California over the next five years.

PG&E is encouraged by the promising work by the BLM, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG) and the California Energy Commission (CEC) and their plans to jointly develop the Desert Renewable Energy Conservation Plan (DRECP) that will cover eight counties in Southern California's Mojave Desert region. The DRECP, in concert with the BLM's Solar Environmental Impact Statement, will help streamline the permitting process as well as support the conservation of sensitive species in the region.

However, these plans will take several years to complete and there are many projects pending approval before these same agencies. Many key stakeholders are uncertain if sufficient preliminary planning and project criteria can be developed and implemented in time for "fast tracked" projects to meet their critical American Recovery and Reinvestment Act (ARRA) and tax incentive deadlines. Many significant policy issues have not been addressed by the regulatory agencies such as habitat and sensitive species mitigation, interim siting criteria for the short term projects, coordination between the federal and state regulatory agencies and the local counties, and use of military lands and private lands as part of the planning and potential mitigation land areas. As a result, Congress should consider an extension of the deadline for stimulus funding incentives, including the Department of Energy loan guarantee and Treasury cash grant programs, to allow more developers to tap into these important sources of financing.

- 4) Media reports have indicated that California Sen. Diane Feinstein is expected to introduce a bill that will place a large part of the Mojave Desert off limits to solar and wind construction. How would this affect PG&E's ability to expand its solar projects given the desirability of that land for solar panels?

The Mojave Desert is the most resource-rich area of the state in terms of solar development. PG&E agrees with Senator Feinstein that we can both protect California's pristine public desert lands and pursue environmentally sound renewable development.

The bill introduced by Senator Feinstein provides for a Desert Trails National Monument reduced in size from the formerly proposed Mother Road monument, and allows an additional eight solar and wind projects to move forward should developers continue to pursue permitting of those sites. In order to encourage development on private land, the bill would also create a pilot endangered species mitigation fund, which renewable project developers may use to mitigate the impacts of their projects sited on private lands. PG&E and many other renewable developers are actively looking for development opportunities on previously disturbed private lands.

- 5) Do you approve of California Governor Arnold Schwarzenegger's recent Executive Order increasing the state's Renewable Portfolio Standard (RPS) to 33% by 2020? A major difference between the Executive Order and similar legislation passed by the state legislature is that the Governor's order allows utilities to access all their renewable power from other Western states, instead of facing some in-state supply restrictions, as specified in the state legislature's bills? What are your thoughts on this?

PG&E has expressed its support for a cost-effective renewable energy standard (RES) designed to deliver 33 percent retail sales of electricity from eligible renewable resources (ERR) by 2020. PG&E has long advocated that, to achieve a 33 percent renewables requirement, eligible resources should, among other things, include all cost-effective, greenhouse gas reducing renewable generation, located anywhere within the Western Electricity Coordinating Council (WECC). By allowing access to WECC-wide resources, the market will be opened to increased competition and a regional approach to finding the best and most affordable resources will be pursued.

- 6) Have you had any conversations with officials within California about your suggestion of better state and federal cooperation on transmission siting? What reaction, if any, have you received?

Yes. PG&E has been in discussion with the responsible agencies. The response has been positive with all agencies recognizing the need to increase state and federal cooperation. The California Public Utilities Commission, as the lead siting and environmental review agency for PG&E's electric transmission projects, has been supportive of improving the permitting process. Other agencies' acknowledgment is manifest in various Memorandums of Understanding between the various permitting agencies most notably, the CDFG, the USFWS, the BLM and the U.S. Department of the Interior. However, the analysis for the scale, volume and pace of renewable development proposed for California alone is unparalleled and the federal and state agencies are not set up to handle this work both in staffing and regulatory expertise. It is also worth noting that local counties and cities in California are an important part of the environmental and regulatory review process, and coordination at this level adds another dimension to the complexity of siting and developing renewable generation and transmission. The willingness to work cooperatively is there but until one or more actual projects are permitted and under construction, the agencies do not have a regulatory

model to follow or improve upon. This is a difficult and complex task at all levels. Having designated leaders at the federal and state regulatory agencies will certainly help to facilitate this discussion and critical decision making.

- 7) Regarding the creation of a "Green Bank," what incentive do taxpayers have to support a new federal entity that would assume great risk by financing new innovations deemed too risky by other conventional banks?

Early public investments in technologies and companies can lead to job creation and broad-based economic growth for the national economy. Taxpayers have long borne risks that conventional banks might not and the incentive for shouldering these risks is that progress toward achievement of a cleaner energy future might be stymied without a "Green Bank." By using public dollars to leverage private investment, project risks can be spread much more widely, reducing the impact on any one individual. This is an important consideration when choosing to finance new innovative technologies which may, or may not, achieve commercial success. Additionally, a "Green Bank" can provide greater flexibility than the current investment tax credit or loan guarantee programs that taxpayers currently fund but that cannot fully utilized in the current economic situation.

**Responses of Ms. Nada Culver, Esq.  
to Written Questions for the Record  
Following Committee Hearing  
“Solar Heats Up: Accelerating Widespread Deployment”  
Held on September 24, 2009**

**Submitted to  
Select Committee on Energy Independence and Global Warming  
U.S. House of Representatives  
December 31, 2009**

**1) The permitting process for solar is burdensome and restrictive. Do you support streamlining the permitting process or are you willing to forego certain solar installations altogether?**

The permitting process currently being used for solar development on public lands is the same process used for other types of development such as transmission lines, pipelines and cell towers. It is not clear that it is either burdensome or restrictive. The Wilderness Society does not believe that there is a cognizable risk of having to forego solar installations in order to ensure sufficient environmental analysis and considerations prior to permitting solar energy development.

The best way to speed construction of environmentally responsible solar projects is by guiding projects to the most appropriate locations – those with limited conflicts with other resources, values and uses. Projects in these areas will face the least amount of controversy and permitting challenges, and will have the best chance of rapid permitting and construction.

As discussed in more detail in my testimony, the BLM is currently conducting a Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development and is also analyzing Solar Energy Study Areas (SESAs) for designation of Solar Energy Zones, where future applications will be focused. At the same time, the agency is devoting substantial resources to evaluating specific projects. Through these ongoing efforts, the agency is moving to ensure that proposed solar projects will be in the most suitable places and most likely to be approved.

The BLM should finalize appropriately sited SESAs as Solar Energy Zones with enough acreage to meet reasonable construction demand for the next 10 years, and restrict development to these areas. Prohibiting development in inappropriate areas outside of the zones will avoid unacceptable impacts and prevent serious conflict and controversy that could be damaging to solar energy development. Dedicating additional resources to projects that are likely to succeed, such as those in Solar Energy Zones, would also improve the time needed for permitting decisions.

Another area for improving the efficiency of the permitting process is in inter-agency coordination. Multiple permits (often a dozen or more for things like transmission interconnection, Endangered Species Act compliance, water use and stormwater management, local zoning, and dust abatement and air quality) are required for most solar projects; early and ongoing coordination among agencies and permitting bodies is critical to avoid bottlenecks. BLM, the California Energy Commission, U.S. Fish and Wildlife Service and the California Department of Fish and Game have already entered into agreements to ensure successful integration of the multiple federal and state permitting laws and regulations. (See *Renewable Energy Action Team, Milestones to Permit California Renewable Portfolio Standard Energy Projects by December, 2010*, [http://www.energy.ca.gov/33by2020/documents/2009-10-15\\_Milestones\\_REAT.PDF](http://www.energy.ca.gov/33by2020/documents/2009-10-15_Milestones_REAT.PDF))

**2) The Wilderness Society proposes a number of high demands and hurdles for project developers to overcome, specifically because of the footprint and quantity of land required. Due to the smaller footprint per unit of energy output for nuclear, is nuclear energy a more environmentally friendly source of energy to pursue?**

The expectations we have for solar energy project developers are consistent with what we would expect from any large-scale commercial energy development activity. Even with the enormous benefits in terms of avoiding air pollution and not contributing to climate change—which are not easily captured in current land planning practices by the agency—solar generation facilities entail adverse ecological impacts. Any commitment of federal resources to development must fully account for and disclose the full range of benefits, impacts, and risks, take steps to avoid or minimize impacts wherever possible, and fully mitigate unavoidable impacts. This includes evaluating the cumulative impact individual projects have in connection with other related and reasonably foreseeable development in the area. This is what federal law requires, and solar projects should not be excepted from compliance.

Solar technologies currently under consideration for deployment on the public lands do, in fact, require significant acreage. Accordingly, the land use requirements for technologies should be evaluated as part of a hard look at the appropriateness of this form of energy development through land management planning processes. In addition, the acreage used for solar technologies underscores the necessity of siting projects in suitable places to minimize conflicts with other resources.

The amount of land needed for large-scale solar technologies should also push federal agencies to evaluate the need for any given project when other, potentially superior clean energy alternatives could meet the same demand. Time and again, our nation's most advanced analytic institutions reaffirm what the environmental community has known since the 1970s: energy efficiency is the first, best option. The National Academy of Sciences noted that “the deployment of existing energy-efficiency technologies is the nearest-term and lowest-cost option for moderating our nation’s demand for energy, especially over the next decade.”<sup>1</sup> Consulting firm McKinsey & Co. concluded that “energy efficiency offers a vast, low-cost energy resource for the U.S. — but only if the nation can craft a comprehensive and innovative approach to unlock it.”<sup>2</sup>

Land use is but one of many impacts from energy development, albeit an often underappreciated one. Looking to land use requirements alone does not begin to address the full lifecycle impacts of these energy sources, which is critical to our nation’s energy policy decisions. Nuclear energy, while requiring a relatively small footprint of land in relation to the energy output from facilities, has a number of impacts that must also be accounted for, including mining and refining fuel, storing and securing waste, and the significant impacts that could result from an operational failure.

Looking to the land use requirements for energy sources is an important factor to consider in making broad national policy decisions and largely dictates project-level siting and mitigation decisions. It underscores the need to safeguard our wildlands during the transition to clean energy. However, it is not the only element to be considered in developing national energy policy.

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<sup>1</sup> See [http://image.newsletters.nas.edu/lib/feed1279776d0c/d/1/AEF\\_ExecSum.pdf](http://image.newsletters.nas.edu/lib/feed1279776d0c/d/1/AEF_ExecSum.pdf)

<sup>2</sup> See [http://www.mckinsey.com/client-service/electric-power/natural-gas/US\\_energy\\_efficiency/](http://www.mckinsey.com/client-service/electric-power/natural-gas/US_energy_efficiency/)

**3) Your testimony notes that if land is used for solar development that you support “additions of lands and resources should equal or exceed the value of any resources or values which are lost.” Who would be the final arbiter in appraising the value of such property?**

We would expect that the applicable land management agency would make final determinations of the value for its land. In making these determinations and evaluating other required measures to compensate for the loss of resources and uses associated with solar energy development (due to the manner in which solar energy precludes other uses), it is vital that federal agencies thoroughly evaluate the affected resources, values and uses of the public lands, such as recreation, scenic vistas, wildlife migration corridors and habitat for other plants and animals.

**4) Media reports have indicated that California Sen. Dianne Feinstein is expected to introduce a bill that will place a large part of the Mojave Desert off limits to solar and wind construction. Does your organization support such legislation? How would this affect the Department of Interior’s (DOI) plans to identify lands for solar and wind construction?**

On Monday, December 21, 2009, Senator Dianne Feinstein (D-CA) introduced legislation to preserve the spectacular heritage of the California desert by creating two new National Monuments and expanding Joshua Tree and Death Valley National Parks and the Mojave National Preserve. The bill would establish new wilderness areas in Death Valley National Park and on lands managed by the Bureau of Land Management (BLM) and the US Forest Service.

Finally, the legislation would also establish a permitting process for all renewable energy projects on BLM land. The Wilderness Society supports the introduction of this important legislation.

The legislation will not adversely affect the DOI’s plans to site wind and solar projects. The BLM is currently assessing the suitability of 351,000 acres in the California desert for potential renewable energy development. This acreage is significantly more than experts estimate is needed to meet the state renewable energy goal. Also, the BLM is moving forward with key projects across the West that propose 5,300 megawatts of new wind, solar, and geothermal power. Neither the BLM study areas nor any of the projects in process are precluded by the land designations in Senator Feinstein’s proposal. Further, no designated corridor for electric transmission would be adversely affected.

**5) Can you further detail your recommendation that “mitigation for impacts to water resources could be addressed by purchase and retirement of water rights to offset groundwater pumping by the project?” How much of a factor is that in the DOI’s consideration of land for solar construction?**

Because use of water for solar energy development will involve long-term commitments, often in places where the availability of water is constrained, it is important that the water use is offset. This approach would be similar to the concepts underlying off-site mitigation for loss of habitat by protecting additional habitat to ensure that there is no net loss. We would expect that this type of program will need to be developed in coordination with affected states.

In terms of the agency's consideration of water use, the BLM states that it will be analyzing the potential impacts to water resources for various types of solar development in the Solar PEIS. Several states, including California, have policies that strongly discourage the use of groundwater for power plant cooling. Most solar projects in California are proposing dry cooling, and some projects proposed in arid areas around the southwest are moving to dry cooling. However, there are some projects which still propose wet cooling and may face challenges and controversy surrounding their water use. We would expect the BLM to take the state's policies into account, in accordance with the agency's obligation (under the Federal Land, Policy and Management Act, 43 U.S. C. § 1712(c)) to seek consistency with state plans, programs and policies. We continue to recommend that the BLM analyze impacts to water resources thoroughly in evaluating proposed solar energy development and developing conditions for approval. Further, BLM should discourage use of wet cooling in water-constrained areas and thoroughly evaluate the availability of water and potential impacts from its use for all solar projects, including those proposing dry cooling (which still require the use of water for washing mirrors).

**6) Thus far, how much land has DOI designated as Solar Energy Study Areas (SESAs)? How long before DOI makes a determination on what will be designated as Solar Energy Zones (SEZ)? Can the process be expedited?**

The maps issued by Secretary Salazar on June 29, 2009, identified 24 SESAs encompassing 676,048 acres of BLM land within the six southwestern states of California, Nevada, Arizona, Utah, New Mexico and Colorado. The SESAs will be analyzed and incorporated into the Draft Solar PEIS, expected to be issued in summer 2010.

As noted above and in my testimony, analyzing SESAs and designating Solar Energy Zones based on both energy potential and avoiding sensitive resources, then limiting development to those zones, is the best way to achieve successful, efficient development of solar energy projects on the public lands. While dedication of additional resources to the Solar PEIS could conceivably assist the BLM, it is critical that the analysis in the PEIS be thorough in order to assure that solar energy development proceeds correctly on the public lands.

**7) If, as you testify, already disturbed lands such as abandoned mines, developed oil and gas fields, fallow agricultural lands, etc provide opportunities for solar energy development, then why don't developers look at such pieces of land to begin with?**

As I noted in my testimony, siting clean renewable energy on idle brownfields and other disturbed sites provides excellent opportunities to reduce urban blight, bring tax-generating businesses into local communities, and to ease the development pressure on greenfields and pristine areas.

Our experience has shown that many developers are simply unaware of the scope of the opportunities or the additional advantages of seeking to site facilities on cleaned-up lands. For example, many developers were not aware that the Environmental Protection Agency (EPA) and National Renewable Energy Laboratory have identified over 9,000 contaminated sites that have renewable energy potential and have produced a map-based tool displaying essential information about these sites. This barrier is being broken down as stakeholder-driven processes such as the

Western Governors Association's Western Renewable Energy Zone (WREZ) process and California's Renewable Energy Transmission Initiative (RETI) incorporate these sites into their generation resource modeling. And state-based initiatives within the federal government, such as Arizona Bureau of Land Management's Restoration Energy Design Project, continue to urge consideration of disturbed lands for renewable energy development in order to minimize siting conflicts. We are also working with the U.S. Conference of Mayors and other groups to raise awareness of the opportunities presented by using disturbed lands, and to support passage of legislation that would incentivize developers to look at such lands.

Some developers point to the potential liability risks of redeveloping these sites. However, EPA has developed information and materials for prospective clean-ups that address landowner liability concerns.<sup>3</sup> For example, EPA can provide comfort/status letters, help to broker prospective purchaser agreements or prospective lessee agreements in which liability relief is provided in exchange for payment and/or cleanup work, or can grant a windfall lien on a property. At a recent listening session convened by EPA in New Orleans, it was clear that the cost and additional time required to clean-up contaminated lands before generation facilities can be built also present unfamiliar challenges to renewable energy developers.

We are confident that by working closely with the EPA's RE-Powering America's Lands Initiative, developers that clean up contaminated sites for renewable energy development will not be saddled with inappropriate financial or liability burdens. Indeed, there are many successful cases of renewable energy already being sited on contaminated sites, including a wind farm on a former steel plant in New York and solar panels on a former landfill in Colorado, among dozens of others. Nonetheless, more needs to be done to account for the multiple additional benefits promised by moving away from business-as-usual toward opportunities to redevelop contaminated lands for renewable energy generation.

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<sup>3</sup> [http://www.epa.gov/oswercpa/faq\\_info.htm#liability](http://www.epa.gov/oswercpa/faq_info.htm#liability)